Manual 2

Ancillary Services Manual

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Revision History

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Version	Date	Revisions
1.0	07/15/1999	Initial Release ➢ Section 2.3.2, page 8 • Clarification of applicability of service charges. ➢ Section 2.3.3, page 10 • Charges Associated with Local Reliability Rules. ➢ Section 3.3.5, page 7 • Clarification of applicability of voltage support charges.
2.0	04/06/2004	Global ➢ Complete reformatting of document. ➢ Grammatical and syntactical corrections. Sections 3.3.1 through 3.3.3, 3.5.1, and 3.5.2 ➢ Deleted references to Six-year testing, and updated the cost determination to reflect current *NYISO Services Tariff* /Rate Schedule No. 2. Section 4.1 ➢ Added "which may vary by hour and by season. Seasonally, the NYISO shall post the hourly regulation and frequency response requirements and, prior to the start of the season, shall present the regulation and frequency response requirements to the SOAS for discussion and comment. Should the NYISO determine that it intends to establish regulation and frequency response requirements for any hour that are lower than any requirement for that hour in the seasonal regulation and frequency response requirements published as of March 1, 2004, it shall present, prior to posting, its analysis and the revised requirement to the Operating Committee for approval. Should the NYISO determine, for reliability reasons, that it intends to establish regulation and frequency response requirements for any hour that are higher than the requirement for that hour currently in effect, it shall raise the requirement, issue a notice as soon as possible, repost the hourly regulation and frequency response requirements for that season, and discuss its adjusted regulation and frequency response requirement for that hour at the next regularly scheduled Operating Committee meeting. Shortly after the end of each Capability Period, the NYISO shall present SOAS with an analyses of the regulation performance in that Capability Period." to second paragraph. Section 4.3 ➢ Added "As specified in Section 4.1, r" to first sentence. Added "or directly from the NYISO." to last sentence.

		Section 4.3.2 ➢ Added "for that day" to first sentence. Attachment B ➢ Replaced Reactive Capability test form with current (2004) version.
3.0	11/01/2005	Global Changes ➢ All Sections and Attachments include changes to reflect SMD2. All references to SCD changed to RTD, Pool Control Error (PCE) changed to ACE, NYISO changed to NYISO, Security Constrained Dispatch to Real-Time Dispatch. ➢ All references to 30- and 10-minute synchronized reserves were changed to 30- and 10-minute spinning reserves. In addition, all references to Transmission Provider (TP) were changed to Transmission Owner (TO). ➢ When and where appropriate, RTD was changed to RTDCAM. ➢ Document formatting was repaired. Section 2.3.3 ➢ Reference to Section 2.2.1 instead of repeating the lengthy description. Section 3 ➢ Added new text after figure 3.1. Sections 3.4.1 and 3.4.2 ➢ Added "Reinstatement of Payments". Section 4.2 ➢ Changed generating unit operating characteristics exhibit and response rate definitions to reflect Technical Bulletin 71. Section 4.3.1 ➢ Updated figure 4.3.1-1. Section 4.3.2 ➢ Added regulation default description. Section 4.3.5 ➢ Added "in proportion to this ramp rate; however, some quantization is needed to avoid very small schedule changes," to second paragraph. Section 4.4.1 ➢ Renamed section to Performance Penalty to Performance Adjustment and deleted Deferral of Regulation Performance Penalties. Section 4.4.2 ➢ Deleted. Old Section 4.4.2, Regulation Performance Penalty, moved to new Attachment D. Section 4.6 ➢ Old Section 4.6 was moved to new Section 4.13.

		Section 4.6.4 ➢ Added "In addition, Attachment D of this Manual provides additional information on performance-based adjustments to regulation service payments" to last paragraph. ➢ Moved equation for K_{PI} and additional text to Attachment D. Section 4.6.5 ➢ Deleted. Sections 4.7 through 4.13 ➢ New additions. Section 6.1 ➢ Joint optimization descriptions added. ➢ Deleted text under figure 6.1-1. Sections 6.2 through 6.10 ➢ Replaces old Sections 6.2 through 6.4. Section 6.2 ➢ Inserted new section and table to be consistent with Technical Bulletin 87. Section 6.7.2 ➢ Added the following paragraph "Scarcity pricing rules A and B are invoked when SCR/EDRP resources are activated and, but for the SCR/EDRP resources, the NYCA would experience a shortage of reserve. Scarcity pricing rule A applies when, but for SCR/EDRP resources, the NYCA would experience a shortage of reserve. Scarcity pricing rule B applies when, but for SCR/EDRP resources, the eastern portion of the NYCA would experience a shortage of reserve." Section 6.11 ➢ Same as old Section 6.5. Section 6.12 ➢ Same as old Section 6.6. Attachments ➢ Deleted original Attachment A – Dispatch Load and Spinning Reserve. The remaining attachments were renumbered. Attachment A ➢ New test forms. Attachment B – AGC Functional Requirements ➢ Under section "Unit Response Rates" • First paragraph – added "A unit may specify up to three NORMAL response rates. When multiple NORMAL response rates are defined, each is applied to a portion of the unit's operating range." • Second paragraph – added "the capacity-weighted" before the three instances of NRR. In addition, made NRR plural.

		➢ End of Ramped RTD Basepoints section, added text from section 5.3.7 of the *Transmission and Dispatching Operations Manual*. Attachment C ➢ Replaced Regulation Performance Penalty with Regulation Performance Adjustment. ➢ Added equation for K_{PI} and additional text from section 4.6.4 to Attachment C. Attachment D ➢ Replaced – Removed actual document and provided a link to the document, which is maintained by NERC. Attachment E ➢ Deleted. Attachment F ➢ Deleted.
3.10	02/26/2008	Section 3.2 ➢ Added clarifying sub-bullet to first bullet in first paragraph. ➢ Added clarifying sub-bullet to first bullet in second paragraph. Section 3.6.2 ➢ Added clarifying language to the lagging MVAr test requirements to third paragraph, including bullets clarifying DMNC test requirements and nameplate data allowances. Section 3.6.4 ➢ Grammatical edits related to Attachment B and the clarification of the usage of a spreadsheet, report, test and form. Sections 4.6.3, 6.10, and Various Sections throughout Manual ➢ Minor formatting changes. Attachment A ➢ Resource table updated with clarifying column-heading information. ➢ Document approval requirements were edited for clarity. Attachment B ➢ Figures B-1, B-2, and B-3 updated with new spreadsheet content.
3.11	09/16/2008	Section 4 ➢ Substantial information added to address Demand Side Ancillary Services (DSASP) related resources. Section 5.3 ➢ Monthly Meter Reading Adjustments detail regarding internal NYISO procedures was removed and reader is directed to refer to the Accounting and Billing Manual for this information. Section 6

		➢ Substantial information added to address Demand Side Ancillary Services related resources. Various Sections throughout Manual ➢ Grammatical edits related to changing language to be consistent with DSASP Tariff language. a spreadsheet, report, test and form. Attachment C ➢ Substantial information added to address Demand Side Ancillary Services (DSASP) related resources. Attachment E ➢ New Attachment added to address Demand Side Ancillary Services (DSASP) related resources.
3.12	04/23/2009	Global ➢ Reformatted per new template to standardize presentation. ➢ Implemented minor stylistic changes. ➢ Standardized labeling and numbering of graphical and tabular material. Revision History Table ➢ Changed column headings as follows: • "Revision" changed to "Version" • "Changes" changed to "Revisions" ➢ Standardized date format to mm/dd/yyyy. ➢ Implemented minor stylistic changes in entries. Section 3.2 ➢ Added provisions for exemption of Leading VAr test requirements. ➢ Changed form to Attachment A-1. ➢ Clarified qualification form submittal requirements. ➢ Included e-mail address for qualification form. Section 3.6 ➢ Added reference to exemption of Leading VAr test requirements. Section 3.6.1 ➢ Added reference to exemption of Leading VAr test requirements in two paragraphs. Section 3.6.2 ➢ Added provision for submitting net metered data for absorbing reactive power. Section 3.6.6 ➢ New section detailing exemption of Leading VAr test requirements. Attachment A ➢ Revised "Attachment A" name to "Attachment A-1." ➢ Clarified qualification form submittal requirements.

		➢ Removed requirement to submit test results at the same time as the qualification form. ➢ Added Attachment A-2, "Request for Identical Treatment." Attachment B ➢ Changed title to "MVAr Capability Test Forms."
3.13	06/02/2009	Global ➢ Revised external-document links to explicitly cite URLs from which documents may be accessed. Section 4 Global ➢ Added process and procedures specific to Limited Energy Storage Resources. ➢ Replaced or inserted, were appropriate, "Regulation" with "Regulation Service." Section 4.2 ➢ Added Figures describing LESR scheduling limits. Section 4.3.2 ➢ Added LESR Regulation Service scheduling protocol. Section 4.3.4 ➢ Modified Description of Regulation Service energy deployments by AGC that include LESR devices. Section 4.3.5 ➢ Described RTD/AGC interaction during the scheduling of LESR Regulation service ➢ Defined treatment of LESRs during RTD-CAM events. Section 4.4 ➢ Defined Performance Tracking exemption in place for LESR devices. Section 4.5.2 ➢ Clarified LESR DAM settlement eligibility. Section 4.6.4 ➢ Clarified LESR Real-Time settlement eligibility. Section 4.7.4 ➢ Added section to describe LESR energy settlements. Section 4.13.2 ➢ Modified Regulation Service Pre-qualification test procedure.
3.14	09/17/2009	Section 3.6.2 ➢ Added requirement for real-power level at which Leading VAr tests must be conducted.
3.15	10/21/2009	Section 7.2 ➢ Corrected reference to Rate Schedule 5 of the *NYISO Market Administration and Control Area Services Tariff* (*Services Tariff*). Section 7.3

		➢ Corrected title and replaced text with reference to Rate Schedule 6 of the *NYISO Open Access Transmission Tariff* (*OATT*), Rate Schedule 5 of the *NYISO Services Tariff*, and the *Accounting and Billing Manual*. Section 7.4 ➢ Added requirement for annual certification.
3.16	07/16/2010	Global ➢ Standardized references to NYISO tariffs and updated tariff citations to reflect section renumbering secondary e-Tariff implementation. Section 3.6.2 ➢ Changed requirements for real-power level for Limited Control Run of River Hydro Resources to test as a percentage of UCAP. ➢ Changed real-power levels for reactive power testing to a table format (Table 3.1). Attachment A ➢ In Attachment A-1, added *UCAP* to column heading for DMNC entry. ➢ In Attachment A-1, added footnote that UCAP is used only for Limited Control Run of River Hydro Resources. Attachment B ➢ Updated Figure B-1 to provide for using UCAP for Limited Control Run of River Hydro Resources.
3.17	09/21/2010	Section 3.6.2 ➢ Updated Table 3.1 to reflect revised real-power level for Leading Reactive Power tests. Section 3.6.4 ➢ Changed timing for reporting test results. Section 3.7.2 ➢ Corrected misspelled word. Section 4.1 ➢ Changed Regulation and Frequency Response Requirement posting to as needed. Section 4.2 ➢ Corrected and added Response Rate Requirements. Section 4.3.1 ➢ Changed paragraph formatting. Section 4.3.2 ➢ Corrected Regulation Service capacity allocation with respect to the Regulation Response Rate. Section 4.7.3 ➢ Corrected equation for Payment/Charge calculation. Section 4.13.2 ➢ Changed MMP to MMA.

		Section 4.13.3 ➢ Changed MMP to MMA. Section 6.1 ➢ Corrected description of transaction types that result in energy loss. Section 6.2.1 ➢ Revised Table 6.2 as follows: • Added zones to locational titles. • Changed Long Island 10-minute Spinning Reserve requirement. • Updated references to NYSRC, NERC and NPCC requirements. Section 6.4.1 ➢ Added reference to Real-Time dispatch. Section 6.8 ➢ Changed paragraph formatting. Section 6.9 ➢ Referred to Market Services Tariff for exceptions to requirements for Self-Supply of Operating Reserves. Section 6.12.2 ➢ Changed MMP to MMA. Attachment D ➢ Removed attachment. Attachment E ➢ Corrected misspelled word.
3.18	11/18/2010	Sections 3.6 and 3.6.1 ➢ Changed timing and requirements for Leading Reactive Power tests. Attachment B ➢ Included certification for Leading Reactive Power tests on Figure B-3.
3.19	2/1/2011- 3/9/2011	Section 4.8 ➢ Updates to the Regulation Service quantities and their associated prices Section 6.8 ➢ Updates to the prices associated with certain reserve products (Total 10-Minute Reserves and Long Island 30 Minute Reserves) Section 7.4 ➢ Updates to black start service procedures for black start Generator actions.
3.20	5/16/2011	Section 3.2

		➢ Removal of language allowing a resource under the operational control of an External Control Area operator to be eligible for supplying VSS Section 3.4.1 ➢ Clarifying the method for determining the payments for VSS suppliers Section 3.5 ➢ Removed VSS penalty structure from the Ancillary Services Manual. This language is found in the Market Services Tariff Section 3.6.1 ➢ Revised the reactive power metering requirements for existing generators ➢ Conformed the Ancillary Services Manual to comply with NPCC Directory #10 test data retention requirements Section 3.6.2 ➢ Conformed the Ancillary Services Manual to comply with NPCC Directory #10 generators with common elements testing requirements
3.22	4/19/2012	Section 3.6.1 ➢ Revised the reactive power metering requirements for existing generators to include an extraordinary circumstances case
3.23	9/21/2012	Global ➢ All references to Customer Relations changed to Stakeholder Services Section 1.2 ➢ Revised language in Table 1.1 Section 2 ➢ Revised language for the title of Section 2 Section 2.1 ➢ Revised language corresponding to title change of Section 2 ➢ Removed Table 2.1 and 2.2 Section 4 ➢ Clarified Regulation Service as Regulation Capacity, where applicable Section 4.2 ➢ Added two-part Regulation Service Bid ➢ Added Regulation Movement Response Rate as static bid parameter Section 4.3.2 ➢ Added language describing summation of Regulation Bid components for use by the optimization ➢ Revised language on Real-Time payments for providing Regulation Service in the Real-Time Market

		Section 4.3.4 ➢ Revised language describing allocation of ACE to Regulation Service resources scheduled by RTD Section 4.3.5 ➢ Specified that AGC will use Regulation Movement Response Rate in determining basepoints ➢ Added Small Event RPU ➢ Clarified that Regulation Service schedules are set to zero during Large and Small Event Pick-ups and Max Gen Pickups ➢ Moved last sentence of 4.10 (resume sending AGC Base Point Signals) to this section Section 4.4 ➢ Added PTS calculation of Movement MW ➢ Removed PTS performance adjustment exclusion for LESRs in settlement calculations Section 4.8 ➢ Reference Rate Schedule 3 of MST for Regulation Service market price calculations ➢ Minor wording revisions to conform with Market Services Tariff Section 4.9 ➢ Deleted section 'Reinstating Performance Charges' (was removed from tariff) Section 4.10 ➢ Deleted section. Redundant with 4.3.5. Moved last sentence (resume sending AGC Base Point Signals) to 4.3.5. Section 4.11 ➢ Section 4.11 now referenced as Section 4.9 Section 4.12 ➢ Section 4.12 now referenced as Section 4.10 Section 4.13 ➢ Section 4.13 now referenced as Section 4.11 Section 4.13.1 ➢ Section 4.13.1 now referenced as Section 4.11.1 Section 4.13.2 ➢ Changed 'regulation ramp rate' to 'Regulation Capacity response rate' ➢ Section 4.13.2 now referenced as Section 4.11.2 Section 4.13.3 ➢ Added that other data besides Performance Index may be used for LESRs ➢ Section 4.13.3 now referenced as Section 4.11.3 Section 6.2.1

		➢ Removal of Table 6.2 Section 6.2.3.1 ➢ Added Requirements for Demand-Side Ancillary Service Program (DSASP) resources Section 6.2.3.2 ➢ Added DSASP Provider Responsibilities Section 6.2.3.3 ➢ Added Interaction with other NYISO Demand Response Programs Section 6.2.3.4 ➢ Added Participation Requirements of Demand Side Resources Aggregated as a DSASP Resource Section 6.2.3.5 ➢ Added Participation Requirements of an Individual Demand Side Resource enrolled as a DSASP Resource Section 6.2.3.6 ➢ Added Enrolling Demand Side Resources into the DemandSide Ancillary Service Program Section 6.2.3.6.1 ➢ Added Enrollment via DRIS Section 6.2.3.6.2 ➢ Added Registration in MIS Section 6.2.3.7 ➢ Added Modeling of DSASP Resources Section 6.2.3.8 ➢ Added Communication Requirements for DSASP Resources Section 6.2.3.9 ➢ Added Limit on Direct Communication for DSASP Resources Section 6.2.3.10 ➢ Added Changes to enrolled and Registered DSASP Resources Section 6.2.3.10.1 ➢ Added Changes to Individual Demand Side Resources Aggregated as a DSASP Resource Section 6.2.3.10.2 ➢ Added Changes to Limits for the Capability Periods of a DSASP Resources Section 6.2.3.11 ➢ Added Metering and Measurement of Aggregated DSASP Resources Section 6.4.1 ➢ Changed 'Regulation Service' to 'Regulation Capacity' Section 7.4

		➢ Added new requirements for black start providers Attachment D ➢ Clarified Regulation Capacity Response Rate ➢ Added Regulation Movement Response Rate
3.24	11/29/2012	Section 3.6.2 ➢ Revised VSS Supplier and NYISO testing notification requirements to those found in TB-155 Section 4.11 ➢ Corrected references to Section 4.13 which is now Section 4.11 Section 4.11.2 ➢ Revised Regulation Service qualification and performance criteria to those found in TB-221
3.25	02/04/2013	Section 6.4.1 ➢ Conform the requirements for synchronized 30-Minute reserves emergency response rate with the requirements found in Rate Schedule of the Market Services Tariff
3.26	03/13/2013	Section 6.2.3 ➢ Across the entire section, changed the use of "aggregation" or "aggregated" to "group" or "grouped" to be consistent with the Demand Response Information System (DRIS). ➢ Clarified in several areas in Section 6.2.3 the use of the Demand Response Information System (DRIS) to enroll Demand Side Resources as individual and grouped DSASP Resources. ➢ Added the responsibility to the DSASP Provider to obtain authorization from each Demand Side Resource allowing the DSASP Provider to act on its behalf. ➢ Added the responsibility of the DSASP Provider to inform NYISO Operations of any temporary de-rate in the DSASP Resources capability. ➢ In multiple areas of Section 6.2.3, revised the responsible department to send registration/enrollment requests (Member Relations). ➢ Provided hyperlinks for metering-related documents. ➢ Clarified and simplified the language associated with which DRIS Response Type of DSRs may be enrolled in Spinning Reserves/Regulation Markets, and the Non-Synchronized Reserve Market. ➢ Added a paragraph to specify how an individual DSR may be enrolled as a grouped DSASP Resource. ➢ Clarified when in the registration process the DSASP Resource may proceed to communications and prequalification testing. ➢ Clarified the process necessary for changes to individual DSRs of a grouped DSASP Resource.

		➢ Clarified that the DSASP Resource must maintain a minimum of 1 MW of Summer and Winter Operating Capacity. ➢ Added verbiage on the DSASP Providers requirement to update the totalization of the real-time metered load within 48 hours of receiving notice of change from the NYISO. Section 6.2.4 ➢ Entirely new section to incorporate the Technical Specifications for DSASP Direct Communications which were approved by BIC on 12/14/2011.
3.2.1	X/X/2011	Section 2.2 & 2.3 ➢ Refer to OATT, MST & Accounting & Billing Manual for Settlement Information Section 3.4 ➢ Refer to OATT, MST & Accounting & Billing Manual for Settlement Information Section 3.6.1 ➢ Move specification of acceptable generator VSS data from section 3.4.1 to section 3.6 Section 4.4, 4.5, 4.6, 4.7, 4.11 & 4.12 ➢ Refer to OATT, MST & Accounting & Billing Manual for Settlement Information Section 4.13.2 ➢ Regulation Test Requirements are adjusted including changes to the testing window for the prequalification performance test Section 6.1, 6.6, 6.7 & 6.10 ➢ Refer to OATT, MST & Accounting & Billing Manual for Settlement Information Attachment C ➢ Refer to OATT, MST & Accounting & Billing Manual for Settlements Information
3.5	05/18/2006	Section 3.1 ➢ Second paragraph – Added Note. Section 3.2 ➢ First para, first sent. – Deleted "Generating" added "Supplier's". ➢ Third bullet, second sent. – Added "range" after capability. Added "…, as directed by…System Operator" to second sentence. Section 3.3 ➢ Third bullet – Deleted "payments…utility generators." Section 3.3.1 ➢ First sent. – Added "synchronous" before generators. Also, added "the gross…MVAr" before capability.

		Section 3.3.2 ➢ First sent. – Added "…as the product of…The NYISO shall…" Also, added "to Suppliers on a monthly basis." Section 3.3.5 ➢ First sent. – Added "in accordance with Rate Schedule No. 2 of the OATT." Deleted second sentence and all other text until section 3.4. Section 3.4 ➢ Added line item #4. ➢ Second paragraph – Added "…and is not otherwise…section 3.6.2." Sections 3.4.1 and 3.4.2 ➢ Line items a) through c) – Added "supplier" deleted "provider". Line item c) – Added "Resource" deleted "provider". New Section 3.4.3 ➢ Added entirely new section. Section 3.5 ➢ First para, first sent. – Deleted "…generators used" added "resources". Also, added "…, and provides the basis…support service". ➢ Second para, first sent. – Deleted "…are used for" added, "participate in". ➢ Second para, second sent. – Added "…reports must be…upon". Also, deleted "for any unit will be accepted" and added "acceptance will be". Section 3.5.1 ➢ First para, first sent. – Added "synchronous" and "voltage support". Second sent. Added "*The demonstrated Gross… (calendar) year.*" Second sentence was completely rewritten. Section 3.5.2 ➢ First para, first sent. – Deleted "conduct" and added "perform and report". Third sent. deleted "terminals" and added "terminal (gross)… interconnection (net)". Added new first paragraph under "Annual Tests". Under "Test Results" deleted "five (5)" and replaced with "ten (10). Added new second sentence "The test report…electronically." Section 3.5.4 ➢ New. Section 3.6.2 ➢ Changed title of section from "Automatic Voltage Regulator Availability" to "Voltage Support Availability". Under "Supplier Actions" added "…is obligated…support capability. The supplier…" Added line item #1 – "The Automatic Voltage…System Operator." Added to line item #2 was rewritten. Added to line item #3 "and TO System Operator…"
		Deleted "needed" and replaced with "necessary." Added "(or other)". Added new line item #4.

3.6	12/08/2006	Attachment B – AGC Functional Requirements ➢ Deleted. There were no references to the Attachment in version 3.5 of the manual. Attachment A – VSS Qualifications Request Form ➢ New. Inserted Qualification Request Form from TB 103. (TB 103 can be retired.) Subsequent Attachments have been relabeled. Section 1.3 ➢ Inserted new section 1.3 "Payments and Charges for Ancillary Services" (from TB 121; TB 121 should be incorporated in the *Accounting and Billing Manual* before being retired). Sections following 1.3 have been renumbered. Section 3.2 ➢ Inserted new section 3.2 Supplier Qualifications (from TB 091 and TB 103); sections following 3.2 have been renumbered. Section 3.6 ➢ Modified in accordance with RT SCHD 2, Sect 1.1. • Changed title of heading to "Reactive Power Capability Demonstration". • Second paragraph – inserted language on providing data during actual operation. • Section 3.6 (old section 3.5) – Incorporated TB 091. (TB 091 can be retired.) Section 3.6.1 ➢ Changed title of heading to "Frequency and Timing". ➢ First paragraph – inserted language stating each calendar year resources providing VSS must demonstrate both lagging and leading reactive capability. Section 3.6.2 ➢ First paragraph – inserted language on how measurements should be taken and how tests must be performed. Section 3.6.4 ➢ Changed title of heading to "Reporting Requirements." ➢ Replaced demonstration with "tests and/or demonstrations." ➢ Section 3.6.4 (old section 3.5.4) – Incorporated TB 126. (TB 126 must also be incorporated in ICAP manual then can be retired.)
3.7	03/08/2007	Administrative Change ➢ Removed 10 Krey Blvd address for Manager, AMO, and replaced with 3890 Carman Road address. Section 3.6
		➢ Clarify that functioning AVR is required during

3.8	06/06/2007	Section 3.2 ➢ Second paragraph – added "Attachment A". Section 3.6 ➢ Second paragraph – corrected "Test data reports must be submitted electronically by the VSS Supplier within ten (10) business days…" – originally stated five (5) business days. Attachment A ➢ Updated first bullet – added, "including voltage regulator…data sheet ("D-curve")." Attachment B ➢ Section B-1 – Restored missing "Reason for Limit" column. ➢ Section B-2 and B-3 – Removed "Part 1" from figure titles.
3.9	10/30/2007	Section 3.1 ➢ Deleted "generation" from first paragraph. Section 3.2 ➢ Formatted first paragraph into bullets. ➢ Corrected address of Manager, Auxiliary Market Operations. Section 3.4.2 ➢ Added "and, except as noted in the following paragraph, Qualified Non-Generator Voltage Support Resources" to first paragraph. Section 3.4.3 ➢ Added "In the case of the Cross-Sound Scheduled Line, the product of $3919/MVAr and that tested, Reactive Power (MVAr) capacity measured at maximum real power flow." as a third bullet. Section 3.4.4 ➢ Clarified definitions of D1, D2, and Bid. Section 3.5 ➢ Added "its Normal Operating limit, which must be at least 90% of its" to first paragraph. Section 3.5.2 ➢ Added "Generators that fail to provide voltage support following contingencies will not be charged lost opportunity costs for replacement sources of voltage support because there will not be enough time to arrange for replacement sources." to paragraph b. Section 3.6.1 ➢ Added the following: "Small units at the same site may apply test results from one unit to another unit at the same site. In order to qualify for this treatment, the units must be electrically identical and must be less than 60 MW nameplate capacity. Qualification to apply test results from one unit to another requires one-time submittal of the Dcurve and registration information for each unit, along with

		a request for this treatment, and pre-approval by the Manager, Auxiliary Market Operations. Each year, a test result form must be submitted for each unit that is requesting this treatment. The test form must reference the PTID of the unit at the site that actually performed the test and the date and time of the test." Section 3.6.5 ➢ Added fourth condition for Out of Period Reactive Capability Testing, with associated guidance: "A nuclear generating unit that has an AVR that is not functioning during the test period." Attachment C ➢ Added clarifying language to table: *each 30-second interval "p" or during each 30-second interval "p"*. ➢ Added definition of "measured output:, $MW_{meas\ p.}$ ➢ Corrected Regulation Performance Index formula.
4.0	12/31/2013	Section 2 ➢ Corrected grammar in statement "payments for services" Section 2.1 ➢ Corrected grammar in statement "payments for services" Section 3.6.2 ➢ Added "Intermittent Power" resources to Table 3.1 Section 4.3.3 ➢ Text removed from the title of Section 4.3.3 and correctly placed at the end of Section 4.3.2 Section 4.4 ➢ Added additional detail on how Performance Adjustments are developed Section 4.11.2 ➢ Changed "month" to "week" in the time weighted Performance Index demonstration period, from TB-211 Section 6.2.3.2 ➢ Updated hyperlink to the Approved Meter List Section 6.2.3.7 ➢ Updated Zone D Station in table to ALCOA_PA 115 Section 6.2.3.11 ➢ DSASP real-time data retention period changed from "five" to "six" years to be maintain consistency with Section 30.6.3.2 and Section 30.6.2.2.3 of Attachment O of the Market Services Tariff Section 7.1 ➢ Added out of period black start testing rules from TB-202 and Appendix II of Rate Schedule 5 of the Market Services Tariff
4.1	03/03/2015	Section 6.2.3.9

		➢ Updated the enrollment limit on the DSASP resources with direct communications to 200 MW.
4.2	06/30/2015	Section 3.4 ➢ Changed "Rate Schedule 2" to "Section 15.2" Section 3.5 ➢ Changed "Rate Schedule 2" to "Section 15.2" Section 3.6 ➢ Changed Leading test frequency from once every three years to once each year ➢ Added Leading demonstrated performance as part of the basis for VSS compensation Section 3.6.1 ➢ Changed Leading test frequency from once every three years to once each year ➢ Added Leading and Lagging demonstrated capability are the basis for VSS compensation ➢ Added specification that gross metering data transmitted to the NYISO will be the basis for test verification, if gross metering is not available then net metering will be used ➢ Leading test period expanded to include January, February, March, April ➢ Removed unnecessary language referring to a 2012 change to the VSS program Section 3.6.2 ➢ Added specification that gross meter data will be used for the purposes of VSS test verification, if gross data is not available then net data will be used Section 3.6.4 ➢ Expanded test form submission deadline to November 15th for the submission of operational data Section 3.7.2 ➢ Changed the penalty for an unreported AVR outage
4.3	12/02/2015	Section 3.2 ➢ Replaced reference to Auxiliary Market Operations with Operations Engineering Section 3.6.2 ➢ Updated the Reactive Capability test notification deadline from 3 to 2 days ➢ Replaced reference to Auxiliary Market Operations with Operations Engineering Section 3.6.6 ➢ Replaced reference to Auxiliary Market Operations with Operations Engineering
4.4	02/01/2016	Section 4.8 ➢ Revised Regulation Service Demand Curve values to: (i) reduce the first price point to $25 per MW; (ii) increase the

		middle price point to $400 per MW; and (iii) increase the third price point to $775 per MW Section 6.2.1 ➢ Added reference to Southeastern New York reserve requirements Section 6.2.3.5 ➢ Minor clarifying revisions regarding eligibility of certain DSASP Resources to provide non-synchronous reserves Section 6.5.1 ➢ Added reference to Southeastern New York reserve clearing prices Section 6.5.2 ➢ Revised to specify that providers of reserves located on Long Island will receive settlement payments as if they were providing reserves in Southeastern New York Section 6.8 ➢ Revised Operating Reserve Demand Curves to: (i) add descriptions of Southeastern New York demand curves for each reserve product; (ii) update the Total Spinning Reserve demand curve value; (iii) update the Total 10-Minute Reserve demand curve value; (iv) update the Eastern 10Minute Reserves demand curve value; (v) update the Total 30-Minute Reserves demand curve values; and (vi) add new subsection 6.8.1 to provide an overview of the reserve, regulation and transmission demand curves implemented by the NYISO.
4.5	04/28/2016	Section 6.8.1 ➢ Revise Transmission Shortage Cost values to reflect implementation of the graduated transmission demand curve
4.6	07/01/2016	Section 3.6.4 ➢ Revised VSS reporting requirement to direct generators to submit test results with the Voltage Support Test Data System. ➢ Changed submission time period for submitting operational data. Attachment B ➢ Removed. No longer applicable.
4.7	10/28/2016	Comprehensive Scarcity Pricing Revisions Section 6.5.3 ➢ New section. Establishing Reserve Clearing Prices during EDRP/SCR Activation Intervals Section 6.8.1 ➢ New section. 30-Minute Operating Reserve Demand Curves during EDRP/SCR Activation Intervals
4.8	12/13/2016	Section 3.6.2

		➢ Updated BTM:NG Resources as a classification of "Generators" for testing purposes Section 4.2 ➢ Updated Source of Service to include BTM:NG Resource Section 4.11.1 ➢ Updated criteria of a Regulation Qualified Resource to include BTM:NG Resources Section 6.1 ➢ Updated Types of Operating Reserves to include BTM:NG Resources Section 6.2.2 ➢ Updated the Supplier Eligibility Criteria for BTM:NG Resources supplying Operating Reserves Section 6.3.1 ➢ Clarified the Operating Reserve products on which BTM:NG Resources may bid in the Day-Ahead Market Section 6.4.1 ➢ Clarified the Operating Reserve products on which BTM:NG Resources may bid in the Real-Time Market
4.9	10/02/2017	Section 6.8.2 ➢ Removed reference to transmission demand curve in section title, description and table
5.0	04/02/2018	Section 8.1 ➢ New section. Introduction of testing requirements for combined cycle units participating in Con Edison MOB program Section 8.2 ➢ New section. Establishes testing requirements for combined cycle units participating in Con Edison MOB program Section 8.3 ➢ New section. Establishes frequency of testing for combined cycle units participating in Con Edison MOB program Section 8.4 ➢ New section. Establishes procedure requirements for testing for combined cycle units participating in Con Edison MOB program Section 8.5 ➢ New section. Establishes documentation and requirements for testing for combined cycle units participating in Con Edison MOB program

5.1	07/17/2019	Global ➢ Updated links and references Section 3.2 ➢ Clarified that all providers must have a functioning AVR Section 3.6.5 ➢ New allowance for Out-of-Period reactive testing for providers prevented from testing by their TO due to a transmission outage Section 4.8 ➢ Updated description of the Regulation Service Demand Curve Section 6.2.1 ➢ Added reference to New York City reserve requirements Section 6.5.1 ➢ Added reference to New York City reserve clearing prices Section 6.5.3 ➢ Added reference to New York City reserve requirements Section 6.8 ➢ Added descriptions of New York City demand curves for each reserve product Section 6.8.1 ➢ Added reference to New York City reserve requirements Section 8.4 ➢ Specified that updates/verifications of automatic fuel swap testing procedures shall be provided to the Manager of OP ENG and Con Ed in the capability period after each test. Section 8.5 ➢ Specified that documentation of automatic fuel swap testing shall be provided in the capability period following each test.
6.0	05/01/2020	Section 6.2.3.2 ➢ Corrected hyperlink to NYISO Revenue Metering Requirements Manual ➢ Removed hyperlink to NYSEME Meter Practices ➢ Removed hyperlink to NYSPSC Approved Meter List ➢ Removed hyperlink to NYSPC Operating Procedure Section 6.2.4.3.1 ➢ Removed reference to PSC approved metering and replaced with reference to MSE, RMR and CCR Manuals ➢ Removed references to PSC Approved Meter List Section 6.2.4.4.4 ➢ Removed reference to NYSPSC approved Section 3.3 ➢ Dual Participation language added to Section 3.3 Responsibilities for Service Section 3.7.2

		➢ Dual Participation language added to Section 3.7.2 Voltage Support Availability Section 4.4 ➢ Dual Participation language added to Section 4.4 Performance Tracking Section 6.2.3 ➢ Dual Participation language added to Section 6.2.3 Other Supplier Requirements Section 6.3.1 ➢ Dual Participation language added to Section 6.3.1 Bidding and Bid Selection Section 6.3.3 ➢ Dual Participation language added to Section 6.3.3 ➢ Responsibilities of Suppliers Scheduled to Provide Operating Reserves in the Day Ahead Market
6.1	MM/DD/YYYY	Section 6.1 Description ➢ Added language in Types of Operating Reserves for Energy Storage Resources Section 6.2.2 Supplier Eligibility Criteria ➢ Added language in Supplier Eligibility Criteria for Energy Storage Resources Section 6.3.1 Bidding and Bid Selection ➢ Added language in Bidding and Bid Selection for Energy Storage Resources

1. Overview

This section gives an overall description of the following Ancillary Services.

- Scheduling, System Control and Dispatch Service
- Voltage Support Service
- Regulation and Frequency Response Service
- Energy Imbalance Service
- Operating Reserve Service
- Black Start Capability Service

1.1. Purpose

The purpose of this Manual is to provide an overview of the Ancillary Services available in the New York market along with settlement process associated with each of the available ancillary services.

1.2. Summary of Services

Ancillary Services support the transmission of energy from resources to loads, while maintaining reliable operation of the New York State (NYS) Power System. Ancillary Services consist of physical equipment and human resources. The New York Independent System Operator (NYISO) is also responsible for directing the actions of Generation Resources and other facilities that provide Ancillary Services to the NYISO.

The NYISO coordinates the provision of all Ancillary Services and directly arranges for the supply of all Ancillary Services that are not self-supplied. Some Ancillary Services must be provided by the NYISO; others can either be provided by the NYISO or procured by the Transmission Customers and Suppliers themselves. Some Ancillary Services are provided at market-based prices, while others, due to the nature of the service, are provided at embedded cost-based prices. All Ancillary Service providers must be scheduled by the NYISO. Figure 1 presents a summary of the NYISO Ancillary Services.

~~Figure 1~~Figure 1:: **Ancillary Services Summary**

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Ancillary Service	Is the Service Location Dependent?	Who provides the Service – NYISO or Self-Supplied (SS)?	What is the Pricing method for the Ancillary Service?
Annual Budget Charge and Other Non-Budget Charges and Payments	No	NYISO	Embedded
Voltage Support Service	No	NYISO	Embedded
Regulation and Frequency Response Service	No	NYISO or (SS)	Market-based
Energy Imbalance Service	No	NYISO	Market-based
Operating Reserve Service	Yes	NYISO or (SS)	Market-based
Black Start Capability Service	Yes	NYISO	Embedded

1.3. Payments and Charges for Ancillary Services

Payments and charges for ancillary services are described in the *NYISO Accounting and Billing Manual* (available from the NYISO Web site at the following URL: ~~http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp~~https://www.nyiso.com/manuals-tech-bulletins-user-guides) and set forth in the *NYISO Open Access Transmission Tariff* (*OATT*) and *NYISO Market Administration and Control Area Services Tariff* (*Services Tariff*) as noted in Figure 2.

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~~Figure 2:~~ Figure 2: **Rate Schedules for Ancillary Services**

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Ancillary Service	*NYISO OATT* Rate Schedule	*NYISO Services Tariff* Rate Schedule
Scheduling, System Control and Dispatch Service	1	1
Voltage Support Service	2	2
Regulation and Frequency Response Service	3	3
Energy Imbalance Service	4	N/A
Operating Reserve Service	5	4 and 6
Black Start Capability Service	6	5

1.4. Self-Supply of Ancillary Services

Transmission Customers and Suppliers are permitted to Self-Supply certain Ancillary Services, as identified in Figure 1. In general, the following process must occur in order to SelfSupply Ancillary Services:

1. A Transmission Customer bids the resource required to provide the Ancillary Service into the Ancillary Services market.
2. The NYISO selects the successful bidders to provide each Ancillary Service. The selection of all Ancillary Service providers is subject to the same locational criteria.
3. Transmission Customers and Suppliers with resources selected by the NYISO use the revenues that they would otherwise have received for providing these services as an offset against charges they would otherwise need to pay the NYISO for the service.
   - The Load Serving Entities (LSE) identify in their application to NYISO the Ancillary Services that they plan to purchase through the NYISO.
   - All suppliers of Ancillary Services using the self-supply option must place the facility under the operational control of the NYISO. All of these resources are subject to the same NYISO locational and performance criteria, and are subject to all payments and penalties as are defined for all other suppliers of the service.
   - For more information, see the *NYISO Accounting and Billing Manual* (available from the NYISO Web site at the following URL: ~~http://www.nyiso.com/public/markets_operations/documents/manuals_guides~~ https://www.nyiso.com/manuals-tech-bulletins-user-guides~~/index.jsp~~)

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1.5. Metering Requirements

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- Ancillary Services Suppliers must ensure that adequate metering data is made available to the NYISO by direct transmission to the NYISO through existing Transmission Owner communication equipment.
- Additionally, for operational purposes, metered data provided to the NYISO must also simultaneously be provided to the Transmission Owner, which will handle such information consistent with the OASIS standards of conduct as specified in FERC Order No. 889.

2. Annual Budget Charge and Other Non-Budget Charges and Payments

This section describes the annual budget charge, other non-budget charges, and payments for services provided by the New York Independent System Operator (NYISO).

2.1. Description

The annual budget charge, other non-budget charges, and payments for service is grouped into three broad categories related to the physical operation of the NY Control Area:

- Physical Operation of the NY Control Area
- Administration of the NYISO tariffs and related agreements ▪ Other Non-Budget Charges

The list of services, together with a description of each service is presented in Rate Schedule 1 the NYISO OATT and the Accounting and Billing Manual.

2.2. Recovery of NYISO Costs

Please refer to Rate Schedule 1 of the NYISO OATT, Rate Schedule 1 of the NYISO ~~Market~~ Services Tariff, and the Accounting and Billing Manual for information about recovery of NYISO costs associated with ISO Annual Budget Charge and Other Non-Budget Charges and Payments.

2.3. Payment for Service

Please refer to Rate Schedule 1 of the NYISO OATT, Rate Schedule 1 of the NYISO ~~Market~~ Services Tariff, and the Accounting and Billing Manual for information about ISO Annual Budget Charge and Other Non-Budget Charges and Payments.

2.4. Services Performed at the Request of a Market Participant

Market Participants may request and pay for the following NYISO Services:

- System Reliability Impact Study (ESRIS)
- Facilities Study
- Local Control Center operator training
- Re-enforcement Option Study (PSC can also request)
- System Impact Study
- Interconnection Study

Studies may also be requested by the New York State Reliability Council (NYSRC). For further details, see the *Transmission Expansion and Interconnection Manual* (available from the NYISO Web site at the following URL:

~~http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp~~https://www.nyiso.com/manuals-tech-bulletins-user-guides).

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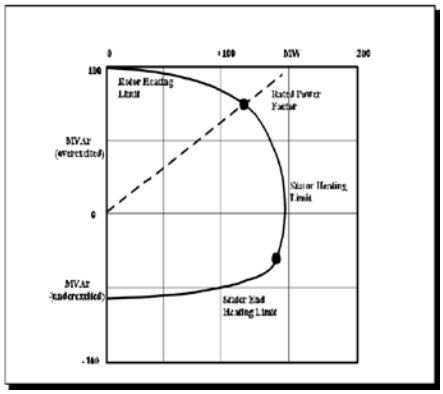
3. Voltage Support Service

This section describes the voltage support service (VSS).

3.1. Description

In order to maintain transmission voltages on the NYS Transmission System within acceptable limits, facilities under the control of the NYISO are operated to produce (or absorb) Reactive Power. Thus, Reactive Supply and Voltage Control Service ("Voltage Support Service") must be provided to support all Transactions on the NYS Transmission System. The amount of VSS that must be supplied will be determined based on the Reactive Power support necessary to maintain transmission voltages within limits that are generally accepted in the region and consistently adhered to by the NYISO.

Figure 3: Generator MVAr versus MW Capability



The ability of a generator to produce or absorb Reactive Power (MVAr) is limited by generator heating considerations. At full load, a generator is able to produce or absorb a relatively small amount of Reactive Power. As the generator's production of real power decreases, its ability to produce or absorb Reactive Power increases. Figure 3, called a reactive capability curve or a D-Curve, is representative of generators limiting characteristics at a particular temperature.

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Reactive capability decreases as the generator heats up and increases as the generator cools down. The reactive capability curve therefore will "shrink" with heating and "expand" with cooling of the machine.

3.2. Supplier Qualification

The NYISO requires that VSS suppliers meet the following criteria. Each resource must:

- Be able to produce and absorb Reactive Power within its tested reactive capability range

If the resource is precluded from running in "lead" mode in which it can absorb reactive power, then the unit is not eligible to provide Voltage Support Services.

The requirement to absorb Reactive Power may be set aside by the NYISO with input from the Transmission Owner in whose Transmission District the Resource is located. To grant an exemption from the requirement that the Resource be able to absorb Reactive Power, the NYISO shall have determined that: (1) the resource is unable, due to transmission system configuration, to absorb Reactive Power; (2) the ability of the resource to produce Reactive Power is needed for system reliability; and (3) for purposes of system reliability the resource does not need to have the ability to absorb Reactive Power.

- Be able to maintain a specific voltage level under both steady-state and post-contingency operating conditions, subject to the limitation of its tested reactive capability
- Be able to automatically respond to voltage control signals; for a generator, a functioning Automatic Voltage Regulator (AVR) is required
- Be under the operational control of the NYISO or a Transmission Owner
- Successfully perform a Reactive Power (MVAr) capability tests in accordance with the NYISO Procedures described below

In order to qualify to receive payments as a VSS Supplier the candidate Supplier, including previously disqualified VSS Suppliers that must re-qualify, must:

- complete a VSS Qualification Form. That form is provided as Attachment A-1 of this manual. The Qualification Form must:
- be completed by a representative of the Supplier and signed by a Vice-President (or equivalent signing authority) of the corporation,
- include a statement of intent to provide Voltage Support Services,

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- have generator documentation attached, including the manufacturer's model number or equivalent data as determined by the NYISO, manufacturer's specifications, a block diagram and associated data, and a generator reactive capability datasheet ("D-curve"), and
-
- have documentation that the ~~synchronous~~ generator or synchronous condenser has an automatic voltage regulator (AVR). This documentation shall include the AVR manufacturer model number, manufacturer's specifications, voltage regulator block diagram, and associated data.
- return the Voltage Support Service Suppliers Qualification Form, and supporting data to the following e-mail box or address:

  vss_test_results@nyiso.com

  Manager, Operations Engineering
  New York Independent System Operator, Inc.
  10 Krey Boulevard
  Rensselaer, NY 12144

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3.3. Responsibilities for Service

The NYISO directs the Supplier's Resources to operate within their tested reactive capability limits. The scheduling of VSS is the responsibility of the NYISO.

- NYISO – The NYISO coordinates the NYS Power System voltages throughout the NYCA.
- Transmission Owners – Transmission Owners are responsible for the local control of the Reactive Power resources that are connected to their network.
- Suppliers – Suppliers are expected to operate their Resources within demonstrated reactive capability limits. VSS suppliers are also expected to maintain a specific voltage level, as directed by the NYISO and the Transmission Owner System Operator, under both steady state and post-contingency operating conditions subject to the limitations of the Resource's tested reactive capability. Resources engaged in Dual Participation and providing VSS must meet all requirements identified in the NYISO Market Services Tariff and this Ancillary Services Manual.

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3.4. Payment for Service

Please refer to Section 15.2 of the NYISO ~~Market~~ Services Tariff for information about Payments for Supplying Voltage Support Service.

3.5. Failure to Perform by Suppliers

Please refer to Section 15.2 of the NYISO ~~Market~~ Services Tariff for information about VSS Supplier failure to perform penalties.

3.6. Reactive Power Capability Testing or Demonstration

The purpose of the Reactive Power capability testing or demonstration is to establish a uniform procedure of determining, confirming, and documenting the Reactive Power capability of VSS Suppliers for real-time system voltage control. VSS suppliers must have a functioning automatic voltage regulator (AVR). The procedures set forth below provide the NYISO with accurate and timely information on the Reactive Power capability of the VSS Suppliers. The demonstration also provides confirmation that the supplier's AVR is in proper working condition and that the supplier is able to automatically adjust its reactive power production or consumption to properly control voltage.

Each year resources that participate in VSS must be tested to demonstrate Lagging and Leading Reactive Power capability. Resources can alternatively provide data collected during actual operation to demonstrate both Lagging and Leading Reactive Power capability. If granted an exemption for absorbing Reactive Power as described in section 3.6.6 of this manual, a resource is not required to demonstrate Leading Reactive Power capability. In all cases, the Supplier's AVR must be enabled and providing automatic voltage control during the demonstration period. Tests may take the form of demonstration of Reactive Power capability based upon actual generator output data or tests conducted pursuant to the procedures set forth in this Manual. Tests must be coordinated with the NYISO and the Transmission Owner (TO) in whose service territory the unit is located. Test data reports must be submitted electronically by the VSS Supplier within ten (10) business days of the test to the NYISO for review and acceptance. The demonstrated performance of the Lagging and Leading Reactive Power capability tests is the basis for compensation to Suppliers of VSS.

Definitions

Lagging MVAr – Reactive Power that is generated out of a generator and into the power system. By convention, lagging MVAr is a positive (+) number.

Leading MVAr – Reactive Power that is absorbed by a generator out of the power system. By convention, leading MVAr is a negative (-) number.

3.6.1. Frequency, Timing, and Other Requirements

At least once each calendar year each Resource providing Voltage Support Service must test or demonstrate Lagging and Leading Reactive Capability. If granted an exemption for absorbing Reactive Power as described in section 3.6.6 of this manual, a resource is not required to demonstrate Leading Reactive Power capability.

The demonstrated gross Lagging and Leading MVAr capability, as verified by metering data transmitted from the NYISO through existing Transmission Owner communication equipment, will

be the basis for compensation in the next compensation (calendar) year. If gross metering data is not available, net metering data of Lagging and Leading MVAr capability will be the basis for compensation in the next compensation (calendar) year. If Transmission Owner communication equipment is down during the test period, the NYISO will accept real time Generator Owner data via direct communications to the NYISO.

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Small units at the same site may apply test results from one unit to another unit at the same site. In order to qualify for this treatment, the units must be electrically identical and must be less than 60 MW nameplate capacity. Qualification to apply test results from one unit to another requires one-time submittal of the D-curve and registration information for each unit, along with a request for this treatment, and pre-approval by the Manager, Operations Engineering. The form to request this treatment is provided as Attachment A-2 Each year, a test result form must be submitted for each unit that is requesting this treatment. The test form must reference the PTID of the unit at the site that actually performed the test and the date and time of the test.

Lagging MVAr capability must be tested or demonstrated during the Summer Capability Period (May 1 through October 31, inclusive). Leading MVAr capability must be tested or demonstrated between January 1 and October 31, inclusive. Failure to test or demonstrate the resource's Reactive Power capability will result in the disqualification of the resource in the next compensation year. If granted an exemption for absorbing Reactive Power as described in section 3.6.6 of this manual, a resource is not required to demonstrate Leading Reactive Power capability. The Supplier's AVR must be enabled and providing automatic voltage control during the demonstration period.

Demonstration results must be retained for the current and most recent prior test period. Any supplemental engineering analysis to support data for the current and most recent prior test period must also be retained.

VSS suppliers that do not make adequate metering data available for the NYISO through existing Transmission Owner communication equipment as required during the Capability Year will be disqualified as VSS suppliers. If Transmission Owner communication equipment is down during the test the NYISO will accept real time Generator Owner data via direct communications to the NYISO. If Transmission Owner communication equipment and Generator Owner real-time data via direct communications to the NYISO are not available, the

NYISO will, under an extraordinary circumstance exception, allow for a remote link to be established from the NYISO to the Generator
Owner data for the purposes of verifying that VSS test. This link must be established within 30-days of Generator Owner receipt of the test results. For the purposes of this exception an extraordinary circumstance shall mean unavailability due to a non-recurring improbable event not experienced in the regular course of business. Any supplier who has been removed from the VSS program due to inadequate metering data may be reinstated as a VSS supplier once that supplier complies with all conditions outlined in Section 3.2 of this Manual.

Lagging MVAr capability testing will normally be performed during on-peak hours. The VSS

Supplier must operate at maximum Lagging MVAr for at least one hour for the test to be acceptable.

The Leading MVAr testing will normally be performed during off-peak hours. The Leading MVAr test shall be scheduled with the corresponding TO, who will inform the NYISO. Prior to conducting the test, the VSS Supplier and the TO shall consult with each other regarding the conditions of the test. The VSS Supplier must operate at maximum Leading MVAr for at least one hour for the test to be acceptable. The megawatt output at the time of the test shall be recorded, and the AVR shall be in service at all times during the test.

A VSS Supplier may schedule additional MVAr tests during the testing periods, however; only one test at a time may be scheduled. When scheduling an additional Reactive Capability Test, the VSS Supplier must again follow the test procedures given below. The VSS Supplier will be placed at the end of the queue for scheduling requests when requesting additional tests during a given capability period.

3.6.2. Test Procedure for Generators

Reactive Power capability tests are to be carried out under normal operating conditions. Extreme measures that might overstate a unit's reactive capability must be avoided. For example, measurements should be made with the unit operating with normal hydrogen pressure (or other normal coolant conditions). The generation serving Behind-the-Meter Net Generation Resources ("BTM:NG Resources") are "Generators" and subject to these testing procedures.

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Both Lagging and Leading MVAr capability are to be measured at the generator terminal (gross) and, if available, at the point of interconnection (net). If generator terminal (gross) metering is not available, then Lagging and Leading MVAr capability are to be measured at the point of interconnection (net). If a VSS Supplier's gross metered data does not reflect its ability to absorb MVArs from the power system, the net metered data at the point of interconnection may be submitted in addition to gross metered data only to demonstrate the Leading MVAr capability of the VSS Supplier, and will not be used as the basis of Leading MVAr compensation.

Effective at the beginning of the 2010 test period, Lagging and Leading tests must be performed at the real power levels described in Figure 4. For both the Lagging and Leading MVAr tests, the real power level within the defined range that is chosen shall be the exclusive decision of the generator.

~~Figure 4~~Figure 4: Real Power Level Requirements for Reactive Power Capability Testing

	Intermittent Power and Limited Control Run-of-River Hydro Resources		All Other Generators	
	Lagging	**Leading**	**Lagging**	**Leading**
ICAP Suppliers[1] and Non-ICAP Suppliers with a Valid DMNC (or DMGC, where appropriate) Test[2]	≥ 90% of UCAP[3]	≥ 10% of UCAP[3]	≥ 90% of DMNC[4]	≥ 10% of DMNC[4]
All Other Non-ICAP Suppliers	≥ 90% of Generator Nameplate MW	≥ 10% of Generator Nameplate MW	≥ 90% of Generator Nameplate MW	≥ 10% of Generator Nameplate MW

1 *ICAP Supplier* refers to resources qualified to supply UCAP as defined in the *NYISO Services Tariff.*

2 DMNC tests cannot be used for Limited Control Run-of-River Hydro Resources that are not ICAP Suppliers.

3 *Unforced Capacity* (*UCAP*) refers to the rating assigned to ICAP Suppliers as defined in the *NYISO Services Tariff.* The UCAP value that is tested to must correspond to the Available UCAP recorded in the NYISO ICAP Automated Market System.

4 *DMNC* refers to the Dependable Maximum Net that is in effect at the time of the test. The DMNC value that is tested to must correspond to the DMNC recorded in the NYISO ICAP Automated Market System.

The verification of Gross Reactive Power Capability and Net Reactive Power Capability for facilities with multiple generators and/or common elements which are dependent upon one

another for normal operation shall be based on the reactive power capability of the facility and not the sum of the capabilities of the individual generators.

The Transmission Owner is responsible for coordinating the test with the respective plant. Each

Transmission Owner shall notify the NYISO at least one hour prior to the initiation of generator MVAr testing. The NYISO in turn notifies any other affected Transmission Owners. Test procedures are set forth below:

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1. The VSS Supplier must notify the NYISO and the Transmission Owner (TO), at least two (2) business days prior to the day that the test is to be performed if the Supplier is a generator sized 25 MW or larger. Other VSS Suppliers must also notify the NYISO and TO of their plan to test, but a two-day notification is not required, though it is encouraged. The following information must be included in the notification of intent to perform a Reactive Capability test:
    - VSS Supplier name (as listed in the NYISO MIS)
    - VSS Supplier point identifier (PTID – a five digit number)
    - Net operating capability of the unit (MW)
    - VSS Supplier operator company name
    - Transmission Owner area
    - Test requested (lagging or leading)
    - Date and time of the test start
    - Name and telephone number of the person requesting the test

A generator that is normally scheduled in the DAM and is operating within 25 MW of its normal operating capability may perform the MVAr test without the 2-day prior notification. If a generator's normal operating capability is less than 25 MW, the 2-day prior notification is also not required but is still recommended.

2. Test approvals are subject to a NYISO reliability review and the NYISO reserves the right to cancel or terminate the test at any time. The TO may also request that the NYISO cancel or terminate the test at any time should local reliability criteria be violated. The NYISO will document all approvals, cancellations, and terminations including the party responsible and reason for implementing the cancellation or termination as described in Section 6 of the Outage Scheduling Manual.

3. On the day prior to the scheduled date of the Reactive Capability Test, generators with a normal MW operating capability of 100 MW or greater must bid energy into the Day-Ahead Market (DAM). The bid must be structured to ensure that the generator is scheduled at the appropriate MW level for the hours requested to perform the Reactive Capability Test. The VSS Supplier must notify the NYISO (notify NYISO Generation Scheduling at (518) 3566050) by hour 14:00 of the prior business day that the unit has been scheduled in the DAM, and that the test will be conducted as scheduled. If the generator is not scheduled, then the Reactive Capability Test is cancelled. If the generator has a net operating capability of less than 100 MW or if the generator is a quick start unit that can be committed by the RealTime Commitment (RTC), a DAM bid is not required. The VSS Supplier must still notify the NYISO and the TO, by hour 14:00 of the prior business day, of the intent to perform a Reactive Capability Test.
4. On the day of the scheduled Reactive Capability Test, the VSS Supplier, through the TO, must request permission from the NYISO System Operator to perform the test at least three (3) hours prior to the test start time. The generator must also bid energy into the Hour-Ahead Market (if not previously committed in the DAM) to ensure that the generator is scheduled at the appropriate MW level for the hours requested to perform the Reactive Capability Test. The NYISO System Operator will approve or deny the request, through the TO, at least two (2) hours prior to the scheduled test, allowing time for any desired Hour-Ahead Market bid adjustments. The NYISO will document all approvals, cancellations and terminations of the tests. The log will include the name of the party and reason for implementing the cancellation or termination.
5. Upon beginning the test, the VSS Supplier must notify the NYISO System Operator, through the TO, that the Reactive Capability Test has started.
6. The NYISO will log that the VSS Supplier is performing a Reactive Capability Test.
7. Upon completion of the test, the VSS Supplier must notify the NYISO System Operator, through the TO, that the test is complete. The NYISO will log the completion time and the name of the generator plant personnel reporting the test.

3.6.3. Test Procedure for Synchronous Condensers

Each synchronous condenser providing this service will be required to demonstrate the maximum leading and lagging MVAr capability it can maintain for one hour.

3.6.4. Reporting Requirements

Suppliers of VSS must submit test results to the NYISO Voltage Support Test Data System within ten (10) business days of the test. Suppliers of VSS using operational data to demonstrate their reactive power capability must submit the operational data to the NYISO Voltage Support Test Data System within ten (10) business days of the end of the test period (October 31st). The submitted data must include supporting performance data including gross and net MW and MVAr output, terminal or station bus voltage, and unit auxiliary load MW and MVAr.

If the lagging and leading MVAr capability tests or demonstrations are performed on different dates, then the results of the lagging and leading tests or demonstrations can be submitted separately.

The NYISO collects generator reactive capability data of VSS Suppliers. The NYISO provides these data to the operating division of the Generator's Transmission Owner (TO) within sixty (60) days of the end of the test period. This allows sufficient time for the NYISO to assemble the data with due consideration to Generator owner reporting requirements.

3.6.5. Allowance for Out-of-Period Reactive Capability Testing

There are ~~four~~ five (5~~4~~) conditions where NYISO will provisionally accept testing for Voltage Support Service when that test is not conducted within the specified test or demonstration period:~~Summer Capability Period.~~

- A new resource entering commercial operation, or
- An existing provider's resource returning to service from an extended forced outage, or
- An existing resource that was prevented from testing during the specified period by the Transmission Owner (TO), in whose Transmission District the resource is located, due to a transmission facility outage, or
- An existing resource becoming eligible to qualify as a VSS supplier, or

- A nuclear generating unit that has an AVR that is not functioning during the test period.

Initial Qualification of New Resource

For a new resource entering commercial service and requesting qualification as a Voltage Support Service supplier, the resource must complete the annual test requirements within thirty (30) days of entering service, and forward the completed test report, in electronic form, to NYISO within ten (10) business days of the completion of that test. The resource shall also provide, in writing, the required documentation of the resource's reactive capability and automatic voltage regulator.

Existing Resource returning from Extended Forced Outage

An existing supplier's resource returning to service following an extended forced outage must complete the annual test requirements within thirty (30) days of returning to service, and forward the completed test report, in electronic form, to NYISO within ten (10) business days of the completion of that test.

Existing Resource prevented from Testing due to a Transmission Facility Outage

An existing supplier's resource that was prevented from testing by a Transmission Owner, due to a transmission facility outage reported to the NYISO in accordance with the Outage Scheduling Manual, must complete the annual test requirements within thirty (30) days of the transmission facility returning to service, and forward the completed test report, in electronic form, to NYISO within ten (10) business days of the completion of that test. Suppliers must notify the NYISO of planned tests within two (2) business days of the Transmission Owner's decision not to allow the test.

Existing Resource becoming eligible as a VSS Supplier

If, as the result of equipment upgrades or changes in qualification requirements, an existing supplier's resource becomes eligible, the Supplier must complete the annual test requirements within thirty (30) days of the effective date of the change in qualification requirement or equipment upgrade, and forward the completed test report, in electronic form, to NYISO within ten (10) business days of the completion of that test.

Nuclear Unit with Non-Functioning AVR

If the unit is able to successfully complete the test with a functioning AVR after the test period but before the end of the current year, full compensation will be allowed for the next payment year. The unit will be required to meet the follow-up requirement set forth below to continue receiving payments after the beginning of the test period. If that test results in reduced voltage support, the payments will be reduced for that entire year, including return of excess compensation for the months before the in-period test.

If the unit is able to successfully conduct an out-of-period test after the beginning of the year, the unit will receive monthly VSS payments at the level achieved in the test for all months following the conduct of the test. To receive payments at the levels achieved in the out-of-period test, the unit will voluntarily provide voltage support within operational limits without compensation in the months of the year prior to its out-of-period test. The unit will be required to meet the follow-up requirement set forth below to continue receiving payments after the beginning of the test period. If the units produces a lower level of MVArs than was achieved in the out-or-period test, the VSS payments will be reduced consistent with the results of the in-period test for the remaining months of the year; provided further, however, should a generator perform a subsequent in-period test that demonstrates a higher level of MVAr capability, the VSS payments will be based on the results of the later test for the remaining months of the year.

Follow-up Testing Requirement

For any of the above conditions, the following conditions and requirements apply:

The NYISO will accept the demonstrated lagging MVAr capability as the basis for compensation on a provisional basis until the beginning of the next Summer Capability Period.

To continue qualification to receive VSS payments the resource is required to perform a complete annual test within thirty (30) days of the start of the Summer Capability Period, and forward the completed test report, in electronic form, to NYISO within ten (10) business days of the completion of that test. This "in period" test will also qualify the resource for continued participation in the VSS in the next compensation year.

3.6.6. Exemption from Requirement to Absorb Reactive Power

The following three conditions must be met in order for the NYISO to grant an exemption from the requirement to absorb Reactive Power.

1. The ability of the resource to produce Reactive Power must be determined by the NYISO to be needed for reliable system operation.
2. The ability of the resource to absorb Reactive Power must be determined by the NYISO to not be necessary for reliable system operation.
3. The resource must be unable, due to system configuration, to absorb Reactive Power.

The NYISO will review a request for exemption with the Transmission Owner in whose Transmission District the Resource is located and determine whether the request will be granted.
An exemption will not be granted over the objection of the Transmission Owner, except upon the approval of the President and Chief Executive Officer of the NYISO. Exemptions that are granted will be reviewed annually with the Transmission Owner in whose Transmission District the resource is located.

All requests for exemptions from absorbing Reactive Power must be made in writing to the Manager of Operations Engineering at the NYISO. These requests must include the specific resource(s) and the basis for requesting the exemption. Additional documentation may be required during the NYISO review. A request for exemption must be signed by an officer of the organization owning the resource (or equivalent signing authority) and can be submitted to the following e-mail box or address:

vss_test_results@nyiso.com

Manager, Operations Engineering
New York Independent System Operator, Inc.
10 Krey Boulevard
Rensselaer, NY 12144

Requests for exemptions from absorbing Reactive Power must be submitted prior to the end of the test period.

3.7. Voltage Support

The following procedures apply to VSS.

3.7.1. Request for Voltage Support Service

The NYISO may request corrective actions from voltage support facilities that are already in service and available. The procedures for Real-Time voltage control are covered in the *NYISO Emergency Operations* and *Transmission and Dispatching Operations* manuals (both of which are available from the NYISO Web site at the following URL: http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.isphttps://www.nyiso.com/manuals-tech-bulletins-user-guides).

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3.7.2. Voltage Support Availability

Supplier Actions:

The supplier is obligated to provide timely notification of any operational restrictions that may limit the voltage support capability, including, for suppliers engaged in Dual Participation, any limitations caused by the services provided by the supplier to the distribution utility or other entity.

The supplier must perform the following:

1. The Automatic Voltage Regulator (AVR) shall be maintained in service in automatic voltage regulation mode at all times, unless instructed otherwise by the NYISO or the Transmission Owner System Operator.
2. Provide immediate notification to the NYISO through the Transmission Owner System Operator whenever the AVR, or any other equipment necessary for maintaining the resource's demonstrated Reactive Power capability (including, but not limited to, auxiliary cooling systems, exciters, etc.) is forced out of service or derated, and provide notice as required by the *NYISO Outage Scheduling Manual* (available from the NYISO Web site at the following URL: http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.isphttps://www.nyiso.com/manuals-tech-bulletins-user-guides) prior to removal from service for scheduled maintenance.

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3. VSS suppliers are required to notify the NYISO of an AVR outage lasting longer than thirty (30) days by submitting a written notice and plans for a timely repair electronically to the following e-mail address:
   vss_test_results@nyiso.com
   Failure to notify the NYISO within thirty (30) days of the outage and submit plans for a timely repair may result in disqualification from the VSS program or reduced monthly VSS payments as outlined in Section 15.2 of the NYISO ~~Market~~ Services Tariff.
4. Notify the NYISO and Transmission Owner System Operator of the estimated time for completion of necessary AVR (or other) repairs, or scheduled maintenance.

5. Notify the NYISO and Transmission Owner System Operator when maintenance is complete and the resource's voltage support capability is fully restored.

4. Regulation and Frequency Response Service

This section describes the regulation and frequency response service.

4.1. Description

Regulation and frequency response services are necessary for the continuous balancing of resources (generation and NY Control Area interchange) with load, and to assist in maintaining scheduled Interconnection frequency at 60 Hz. This service is accomplished by committing

Generators including Limited Energy Storage Resources (LESRs) and Demand Side Resources (Regulation Service Suppliers) whose output or demand is raised or lowered (predominately using Automatic Generation Control (AGC)) as necessary to follow moment-by-moment changes in load.

The service is in addition to operating reserve services required for system contingency purposes. The NYISO offers regulation and frequency response services to serve Load within the NY Control Area.

The NYISO establishes the regulation and frequency response requirements consistent with criteria established by North American Electric Reliability Council (NERC), which may vary by hour and by season. The NYISO shall post the hourly regulation and frequency response requirements and shall present any updates of the regulation and frequency response requirements to the System Operation Advisory Subcommittee (SOAS) for discussion and comment. Should the NYISO determine that it intends to establish regulation and frequency response requirements for any hour that are lower than any requirement for that hour in the seasonal regulation and frequency response requirements published as of March 1, 2004, it shall present, prior to posting, its analysis and the revised requirement to the Operating Committee for approval. Should the NYISO determine, for reliability reasons, that it intends to establish regulation and frequency response requirements for any hour that are higher than the requirement for that hour currently in effect, it shall raise the requirement, issue a notice as soon as possible, repost the hourly regulation and frequency response requirements for that season, and discuss its adjusted regulation and frequency response requirement for that hour at the next regularly scheduled Operating Committee meeting. Shortly after the end of each Capability Period, the NYISO shall present SOAS with an

analysis of the regulation performance in that Capability Period. The NYISO also establishes Regulation Service Supplier performance measurement criteria and procedures for bidder qualification and for the disqualification of bidders that fail to meet such criteria as defined in section 4.11~~4.11~~.

4.2. Source of Service

Regulation Service is bid into the market by Regulation Service qualified suppliers that have AGC capability and that wish to participate in the Regulation Service Market. Generators and
Demand Side Resources bidding to provide Regulation Service are required to submit two-part Bids, consisting of the following: a Regulation Capacity Bid indicating the MW and price ($/MW) of the Regulation Capacity they are making available to the NYISO, and a Regulation Movement Bid indicating the price ($/MW) for each MW of Regulation Movement they can provide when instructed. Regulation Service Resources are not obligated to participate and provide Regulation Service unless they have bid for Regulation Service and that bid has been accepted. If the Supplier is a Behind-the-Meter Net Generation Resource, the ISO shall only consider price-MW pairs in excess of the forecasted Host Load for the Resource.

The NYISO selects Regulation Service in the Day-Ahead Market and the Real-Time Market from qualified Resources that bid to provide Regulation Service. Market Participants may submit bids to the NYISO for Regulation Service up to the Real-Time Market market-close time (75-minutes prior to the operation hour).

The bid evaluation program validates a Regulation Service bid and returns a message to the bidder indicating that data supplied is either validation passed or validation failed. Validation passed and validation failed bids (or any bid) may be changed and resubmitted prior to market closing time. Bid information includes:

- Regulation Capacity price, in $/MW
- Regulation Movement price, in $/MW
- Regulation Capacity MW – regulation capacity available in one direction

For example a bid of 5 MWs is a bid to provide 5 MWs of regulation up and 5 MWs of regulation down.

There are also static bid parameters that can be modified only through a request to the NYISO:

- Regulation Capacity Response Rate (RCRR), in MW/min, with the exception that LESRs are not required to provide a RCRR.
- Regulation Movement Response Rate (RMRR), in MW/6 seconds. Regulation suppliers are not required to provide a Regulation Movement Response Rate. By default, the RMRR will be established as the RCRR ÷ 10. Regulation suppliers may provide a RMRR that exceeds the equivalent RCRR in the event that the supplier is capable of responding at a faster response rate; however, the RMRR may not be less than the RCRR on a time-equivalent basis.

The NYISO Market Participants User's Guide describes the bidding protocols and the checks that the NYISO makes to ensure validity. For Generators that are not LESR devices and Demand Side Resources, the maximum Regulation Capacity (or regulating margin) that can be offered is calculated as the regulation capacity response rate times five minutes. For LESR devices, the maximum Regulation Capacity that can be offered is the unit's bid in Upper Operating Limit. A Behind-the-Meter Net Generation Resource that is comprised of more than one generating unit that is dispatched as an aggregate unit at a single PTID is not qualified to provide Regulation Service or Spinning Reserves.

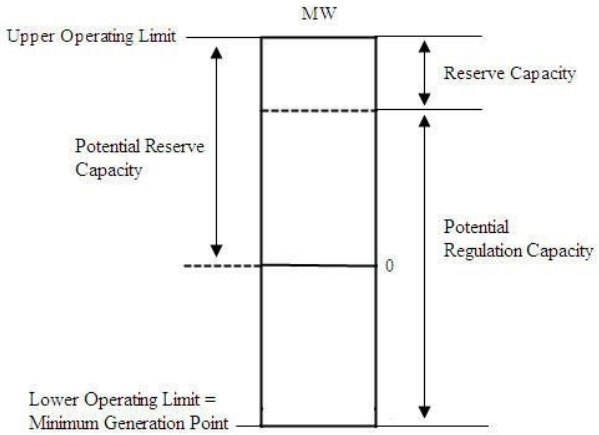
Figure 5 shows how Regulation Capacity is defined with respect to a Demand Side Resource's operating range. The assumption in this scenario is that the Demand Side Resource has not been scheduled to provide energy other than to support a Regulation Service schedule.

Figure 6 shows how Regulation Capacity is defined with respect to a generating unit's operating range, for the situation without Reserve activation.

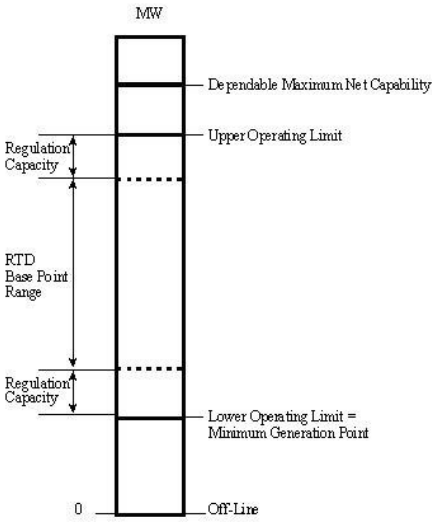
Figure 7 shows the Regulation Service deployment for an LESR that has no energy limitations and has an accepted bid for its full bid Regulation Capacity. The Upper and Lower Regulating Limits = the Upper Operating and Lower Operating limits respectively.

Figure 8 shows the Regulation Service deployment for an LESR whose energy storage position limits the amount of Regulation Service it can provide. RTD has set a BP to consume, and the Regulation Service deployed is centered on that BP. The Upper Regulating Limit is reduced below the Upper Operating Limit as the energy storage is limited and the device cannot sustain energy injection at its maximum operating capacity for the next 5 minute RTD interval.

~~Figure 5~~Figure 5:: Demand Side Resources Operating Characteristics



~~Figure 6:~~Figure 6: Generating Unit Operating Characteristics



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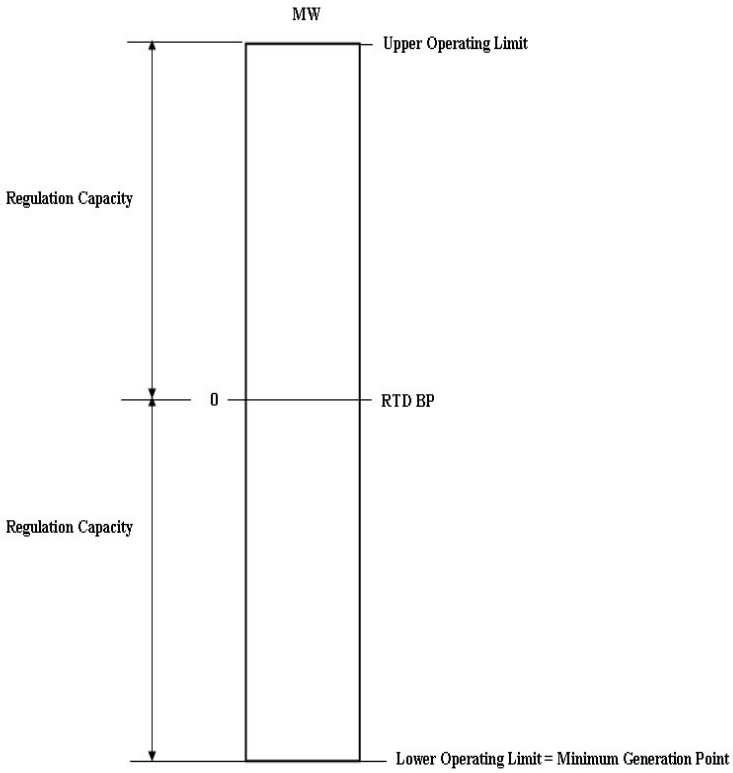
~~Figure 7~~Figure 7:: LESR with Full Regulation Service Deployment



~~Figure 8~~

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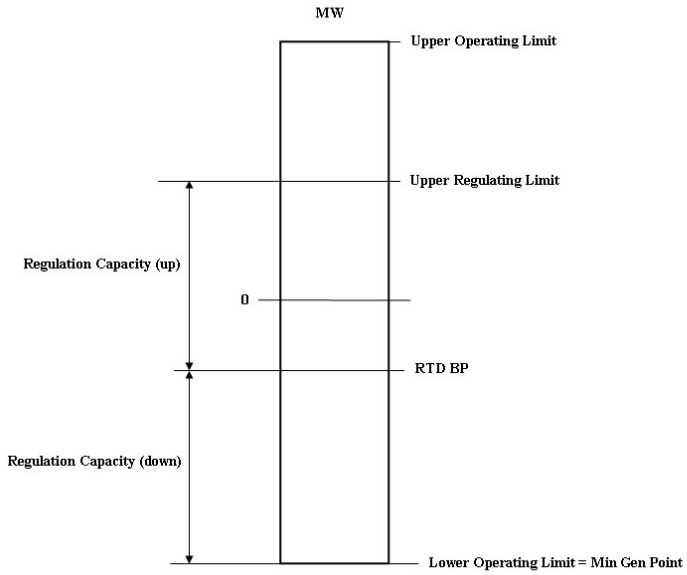
Figure 8: LESR with RTD Managing Energy Level; Equal Reg Up and Reg Down



Note: Modification of response rates must be coordinated with Stakeholder Services.

There are up to six response rates that are provided by the suppliers:

- *Normal Response Rate (NRR)* – There may be up to ***three*** response rates given with each generator. They are used under non-reserve pickup conditions.
- *Regulation Capacity Response Rate (RCRR)* – This response rate is used for scheduling Regulation Capacity.
- *Regulation Movement Response Rate (RMRR) - This response rate is used for dispatching Regulation Service providers.*
- *Emergency Response Rate (ERR)* – This response rate is used under reserve pickup conditions. ERR must be greater than or equal to the maximum NRR. Demand Side Ancillary Service Providers may only bid one NRR and the ERR must equal the NRR.

Note: With the exception of RMRR, the above response rates are not applicable to LESRs.

For all Regulation Service providers except LESRs, the RCRR must be ≤ to the minimum NRR, and the ERR must be ≥ to the maximum NRR. The minimum NRR must be ≥ 0.01 * Maximum
Summer Operating Limit (Summer Capability Period) and ≥ 0.01 * Maximum Winter Operating Limit (Winter Capability Period). The Maximum Summer and Winter Operating Limits are modified by Stakeholder Services and are described in the *NYISO Market Participants User Guide* (available from the NYISO Web site at http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsphttps://www.nyiso.com/manuals-tech-bulletins-user-guides).

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Regulation Service providers are not required to provide a RMRR, but should supply one if they want a value other than the default value of RCRR ÷ 10. If submitted, the RMRR must be ≥ RCRR ÷ 10

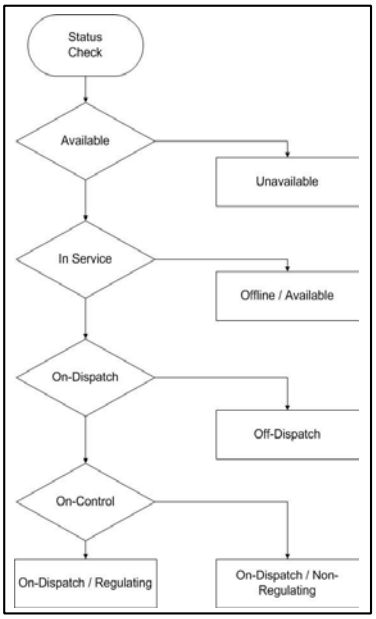
- Individual units may bid into the market as groups of units, providing the units are prequalified to be bid and operated together as though they are a single unit for all generator bid services (units participating as part of a group are not allowed to bid individually or as part of another group). Pre-qualification specifications for units to bid as a group include metering support, billing, and performance measurements as if a single unit.

4.3. Scheduling of Service

Regulation Service requirements are determined by the NYISO consistent with industry standards set by NERC. The Regulation Service requirements may include locational requirements and consider transmission constraints. Automatic Generation Control signals for Regulation Service are transmitted to the individual units via the Transmission Owners. Regulation Service providers may also receive Regulation Service signals directly from the NYISO. Receiving regulation signals directly from the NYISO does not eliminate the need to receive signals directly from the TO.

4.3.1. Generating Unit Operating States

Figure 9: Generating Unit Operating States



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Generating units have the NYISO operating states as shown in Figure 9. Demand Side Resources participating in the energy or ancillary services programs for scheduling purposes are modeled as generators. This class of supplier has the same operating states as physical generating units.

- ***Unavailable*** – The unit is Off-Line and is not available for any ancillary services contribution.
- ***Off-Line/Available*** – The unit is Out-of-Service and Off-Line, but is available for ancillary services contribution.
- ***Fixed (Off-Dispatch)*** – The unit is In-Service and On-Line and is not under automatic control. This unit's RT schedule is predetermined. Schedule changes may occur only on the quarter hour.
- ***Flexible (On-Dispatch) and Non-Regulating*** – The unit typically is not under automatic control. The basepoint for the unit is normally updated every five minutes. The unit does not participate in Regulation Service.
- ***Flexible (On-Dispatch) and Regulating*** – The unit is under automatic control. The unit has an Energy schedule that is established by RTD. The unit participates in

Regulation Service as directed by AGC and, thus, may be requested to deviate from its RTD schedule.

4.3.2. Regulation Service Capacity Scheduling

In the Day-Ahead and Real-Time Markets, the NYISO submits to its scheduling and pricing software the Regulation Service Bids provided by each Supplier for use in solving to meet the NYISO's Regulation Capacity requirement. Specifically, the NYISO enters into the Day-Ahead and real-time software each Regulation Service Supplier's Regulation Capacity Bid MW and the sum of its i) Regulation Capacity Bid price and ii) the product of: a) the Supplier's Regulation Movement Bid price and b) the Regulation Movement Multiplier established for that hour.

Generators and Demand Side Resources

The Regulation Capacity awarded to each Regulation Service resource that was selected to provide Regulation Service is based on the economics of the bid and the NYISO Regulation Service requirement, not to exceed the lesser of the regulation response rate (RRR) times 5 minutes or the regulation availability MW's bid.

Regulation Capacity comprises two regions. The upper region is bounded by the unit upper operating limit. The lower region is bounded by the minimum generation point. Each region is equal to the Regulation Capacity accepted for that Unit. (See Figure 5.)

Limited Energy Storage Resources

All offers by LESR devices in the Day-Ahead Regulation Services Market are evaluated and scheduled on an hourly basis without consideration that there may be energy limitations during the operating hour, due to the LESR's energy storage position, that may prevent the LESR from providing as much Regulation Service in real-time as it was scheduled to provide in the Day-Ahead Market.

In real-time, the amount of Regulation Capacity that an LESR can provide will depend on the current energy storage position of the LESR. As the amount of energy stored in the device increases or decreases, the amount of Regulation Service that can be sustained over an RTD interval may be less than the amount of Regulation Capacity originally offered in the Real-Time Market. In such cases, the RTD system will reduce amount of Regulation Capacity offered to reflect the amount of Regulation Service the LESR is currently able to provide, given its energy storage position. The amount of Regulation Capacity that an LESR is actually

scheduled to provide in the Real-Time Market is based on this calculation of the amount of Regulation Capacity it is able to provide, given its energy storage position, and the economics of the bid.

The Regulation Capacity calculation is performed by taking the measured energy storage position of the device and calculating an upper and lower regulation limit (URL, LRL). The midpoint of the upper and lower limits establishes an RTD base point and the available Regulation Capacity = .5 * (URL + abs (LRL)).

During energy shortage intervals, as indicated by the activation of the Regulation Service Demand Curve, the Regulation Capacity offer may be further reduced. The Regulation Capacity available to be scheduled during the energy shortage condition is based on the energy storage position of the device with an RTD base point set equal to 0. The available Regulation Capacity = Min (abs (LRL, URL)).

Commitment for Additional Regulation

The NYISO may commit additional resources in the real-time market to provide Regulation Service if any of the following conditions exist:

1. Insufficient Regulation Service MW is bid into the Day-Ahead Market.
2. Resources that were scheduled in the Day-Ahead Market to provide Regulation Service are not available in real-time.
3. More Regulation Service is required than had been anticipated would be needed in the Day Ahead Market.

Regulation Service in Real-Time

Regulation Service Suppliers, including those not awarded a forward contract to provide Regulation Service in the Day-Ahead market, may bid uncommitted capacity into the Real-time market to provide Regulation Service. A Resource providing Regulation Service in the Real-time market will be paid based on its real-time schedule for Regulation Capacity at the Regulation Capacity Market Price, and its real-time Movement MW at the Regulation Movement Market Price, taking into account the resource's performance relative to its instruction. The Resource will also be subject to a Regulation Service performance charge to account for non-performance. Calculation of Day-Ahead and Real-Time Regulation Market Prices is defined in Rate Schedule 3 of the NYISO ~~Market~~ Services Tariff.

A Supplier with a Day-Ahead Regulation Service schedule that notifies the NYISO that it cannot provide Regulation Service in real-time will receive a zero real-time Regulation

Capacity schedule and buy out of its Day-Ahead commitment. A Supplier with a real-time Regulation Service schedule is subject to the performance settlement provisions as defined in section 4.6. A Supplier with a Day Ahead Regulation Service schedule that continues into Real-Time is subject to the balancing and performance settlement provisions as defined in section 4.6. A Supplier that is providing Regulation Service using an LESR will be subject to Regulation Service balancing in real time for any Regulation Capacity scheduled day ahead that is not scheduled in real time as a result of the LESR's energy storage limitations.

4.3.3. Control Signals to Satellite Control Centers

Control signals designating the value of Unit Desired Generation (UDG) for each Resource are sent to the satellite control centers every six seconds. For Demand Side Resources, the UDG is the terminology used to indicate the AGC 6 second regulation schedule.

4.3.4. Regulation Service

The AGC function calculates an area control error (ACE) and allocates this error to Regulation Service providers scheduled by RTD. The ACE is allocated to all Regulation Service resources proportionally based on the amount of Regulation Movement MWs they are able to provide in the next six seconds using their Regulation Movement Response Rates, their current physical limitations, and security constraints. AGC will determine the UDG for each Resource by combining the Resource's Regulation requirement (if any) with its ramped basepoint derived from its RTD 5 minute basepoint, if any. The NYISO computer system will send UDGs to TOs that will in turn retransmit the UDGs to Regulation Service Resources in their control area. Regulation Service balancing payments and charges for all NYCA resources will be assigned by the NYISO directly to individual suppliers based on their monitored performance.

When LESR devices are approaching their energy limitations, as measured by their metered energy storage, AGC will transfer regulation energy deployments from the LESR's to other suppliers. This transfer is calculated by AGC and is designed such that the LESR's regulation energy schedule will become zero to coincide with the time that the LESR is either fully charged or fully discharged.

The amount of Regulation Capacity (MW) and Regulation Capacity Response Rate (MW/Minute) that is required for the NY Control Area is established by the NYISO and can vary on a seasonal and hourly basis. The *NYISO Transmission and Dispatching Operations*

Manual (available from the NYISO Web site at the following URL: ~~http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp~~https://www.nyiso.com/manuals-tech-bulletins-user-guides) describes how the Regulation Service requirements are defined for the New York Control Area.

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4.3.5. AGC and RTD Program Response

The AGC program uses each supplier's Regulation Movement Response Rate in determining base points. The RTD program uses the Normal Response Rate(s). RTD will assign basepoints to LESRs based solely on their stored energy levels. RTD-CAM may use either the Normal or the Emergency Response Rate, depending on reserve activation. All flexible Resources, including those with and without a real-time reserve schedule, may be required to respond to a reserve Pick Up.

Resources with a real-time reserve schedule will have base points calculated using their Emergency

Response Rates, others will have base points calculated using their Normal Response Rates. For

RTD-CAM modes of Large or Small Event Reserve Pick-ups or Max Gen Pickups, all Regulation Service schedules are set to zero and LESRs will be assigned a zero RTD base point. If upon occurrence of these events the LESR is consuming energy, AGC will immediately assign the device a zero UDG. If the device is injecting energy, AGC will hold the LESR UDG for the duration of the event or as long as possible subject to the energy storage remaining in the device. The NYISO will resume sending AGC Base Point Signals as soon as possible after the end of the reserve or maximum generation pickup.

When more Regulation Service is required, the NYISO may request more Regulation Service capacity from the real-time Regulation Service market.

A minimum ACE distribution value is established by the NYISO so that base point changes are distributed to only a few (or one) units when ACE is small.

4.4. Performance Tracking

The NYISO has a Performance Tracking System (PTS) to monitor the performance of Resources that provide Regulation Service. Payments and charges by the NYISO to each Supplier of this Service are based in part on the Resource's performance with respect to expectations. The PTS will also be used to calculate, for each RTD interval, the total Movement

MW instructed for each unit that was scheduled to provide regulation, and to determine penalties assessed to non-regulating Resources that do not follow their RTD basepoints, thereby increasing the regulation burden.

Figure 10 illustrates a regulating Resource that has perfect performance and illustrates a regulating Resource with performance errors.

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~~Figure 10~~Figure 10: **Perfect Performance**

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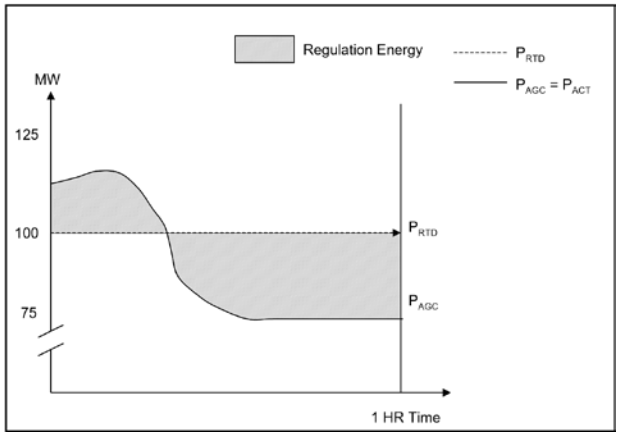
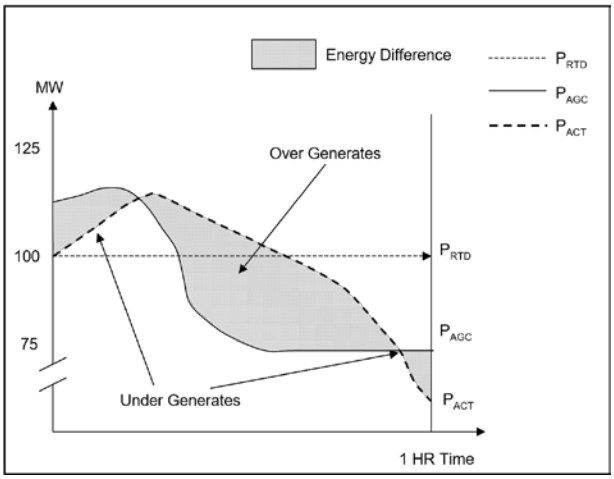


~~Figure 11~~Figure 11: **Error in Performance (30-Second Bandwidth not Included)**



Regulation Service Resources, including Resources engaged in Dual Participation, are required to change their output level at a rate consistent with the amount of Regulation Service each resource has been scheduled to provide.

Regulation Service Resources will not receive payments for additional Regulation Capacity as a result of following AGC signals that call for them to provide more Regulation Service than they have been scheduled to provide; but they will be paid for any additional energy they produce as a result of following such signals.

Performance Adjustment

Based on the performance measurements developed by PTS and the Billing Settlement System, the Billing Settlement System will calculate performance adjustments for both Regulation Service Suppliers and Energy Suppliers that are not providing Regulation Service. Appendix G of the
Accounting and Billing manual presents a detailed description of the calculation of Regulation Service performance adjustments and Appendix I.7 presents a detailed description of the Under Generation Penalty Settlement.

4.5. Regulation Service Settlements – Day-Ahead Market

Please refer to Rate Schedule 3 of the NYISO OATT, Rate Schedule 3 of the NYISO ~~Market~~ Services Tariff, and the Accounting and Billing Manual for information about Day Ahead Market Settlements.

4.6. Regulation Service Settlements – Real-Time Markets

Please refer to Rate Schedule 3 of the NYISO OATT, Rate Schedule 3 of the NYISO ~~Market~~ Services Tariff, and the Accounting and Billing Manual for information about Real-Time Market Settlements.

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4.7. Energy Settlement Rules for Generators Providing Regulation Service

Please refer to Rate Schedule 3 of the NYISO OATT, Rate Schedule 3 of the NYISO ~~Market~~ Services Tariff, and the Accounting and Billing Manual for information about Energy Settlement rules for generators providing Regulation Service.

4.8. Regulation Service Demand Curve

The NYISO shall establish a Regulation Service Demand Curve that will apply to both the Day-Ahead and real-time Regulation Capacity Market Price and settlements. The market prices for Regulation Capacity calculated pursuant to Rate Schedule 3 of the NYISO ~~Market~~ Services Tariff shall take account of the demand curve established in Rate Schedule 3, so that Regulation Capacity is not scheduled at a cost higher than the demand curve indicates should be paid in the relevant market.

The NYISO shall establish and post a target level of Regulation Service for each hour, which will be the number of MW of Regulation Capacity that the NYISO would seek to maintain in that hour.

The NYISO will then define a Regulation Service Demand Curve for that hour as follows:

1. For quantities of Regulation Capacity that are less than or equal to the target level of Regulation Service minus 80 MW, the price on the Regulation Service demand curve shall be $775/MW.
2. For quantities of Regulation Capacity that are less than or equal to the target level of Regulation Service minus 25 MW but that exceed the target level of Regulation Service minus 80 MW, the price on the Regulation Service demand curve shall be $525~~400~~/MW.

3. For quantities of Regulation Capacity that are less than or equal to the target level of Regulation Service but that exceed the target level of Regulation Service minus 25 MW, the price on the Regulation Service demand curve shall be $25/MW.
4. For all other quantities, the price on the Regulation Service demand curve shall be $0/MW. However, the NYISO shall not schedule more Regulation Service than the target level for the requirement for that hour.

In order to respond to operational or reliability problems that arise in Real-Time, the NYISO may procure Regulation Capacity at a quantity and/or price point different from those specified above. The NYISO shall post a notice of any such purchase as soon as reasonably possible and shall report on the reasons for such purchases at the next meeting of its Business Issues Committee. The NYISO shall also investigate whether it is necessary to modify the quantity and price points specified above to avoid future operational or reliability problems. The NYISO will consult with its Market Monitoring Unit when it conducts this investigation.

If the NYISO determines that it is necessary to modify the quantity and/or price points specified above in order to avoid future operational or reliability problems, it may temporarily modify them for a period of up to ninety days. If circumstances reasonably allow, the NYISO will consult with its Market Monitoring Unit, the Business Issues Committee, FERC, and the PSC before implementing any such modifications. In all circumstances, the NYISO will consult with those entities as soon as reasonably possible after implementing a temporary modification.

The NYISO shall conduct periodic reviews as to whether the Regulation Service Demand Curve should be adjusted to optimize the economic efficiency of the NYISO Markets. The Market Monitoring Unit shall be given the opportunity to review and comment on the NYISO's periodic reviews of the Regulation Service Demand Curve.

4.9. Charges Applicable to Suppliers That Are Not Providing Regulation Service

Please refer to Rate Schedule 3-A of the NYISO ~~Market~~ Services Tariff and the Accounting and Billing Manual for information about charges applicable to suppliers that are not providing Regulation Service.

4.10. Charges to Load Serving Entities

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Please refer to Rate Schedule 3 of the NYISO OATT Rate Schedule 3 of the and the Accounting and Billing Manual for information about charges to Load Serving Entities.

4.11. Regulation Service Qualification and Performance Criteria

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4.11.1. Regulation Qualified Resource Requirements

Any Resource that meets the following criteria will be considered a Regulation Qualified Resource and may submit offers for Regulation Service. All Regulation Qualified Resources must:

- Have the appropriate control equipment installed and be capable of providing Regulation Service.
- Be capable of receiving and responding to automatic control signals on a 6 second periodicity and must provide telemetered output data that can be scanned every 6 seconds.
- Provide for all required interfaces to the Transmission Owner (TO) control centers as defined by the TOs as described in the TO-MP Interconnection Agreement (if any).
- In order for a Demand Side Resource to provide Regulation Service the Demand Side Resource must take service from a qualified Load Serving Entity which is subject to the energy settlements of the *NYISO Services Tariff* and *NYISO OATT*.
- Be capable of supplying Regulation Service continuously in both the up or down direction for intervals in the scheduled hour and for all hours with accepted bids.
- Register the intent to provide Regulation Service with the Stakeholder Services department and provide all data required as defined in the Market Participant Registration Packet.
- Post all collateral requirements as defined in the *NYISO Service Tariff* Attachment K and Section 2 of the Market Participant Registration Packet.
- If requesting to qualify or required to re-qualify as a Regulation Service Supplier, successfully complete the pre-qualification performance test as described in section 4.11.2
- A Behind-the-Meter Net Generation Resource that is comprised of more than one generating unit that is dispatched as an aggregate unit at a single PTID is not qualified to provide Regulation Service or Spinning Reserves.

4.11.2. Prequalification Performance Test

All participants requesting to become Regulation Service Suppliers and all participants that are required to prequalify as Regulation Service Suppliers must successfully complete the prequalification performance test.

- Market Participants must notify the Stakeholder Services department of their intent to complete a Regulation Service pre-qualification test. All qualification criteria defined in section 4.11.1 must be completed prior to the test request.
- Stakeholder Services will coordinate with Grid Operations to schedule the test.
- Once a time period has been identified, Stakeholder Services will activate the Regulation Service bidding privileges of the test participant.

- The Market Participant will be notified by a NYISO Stakeholder Services representative a minimum of two days prior to the test period, instructing the Supplier to begin bidding to provide Regulation Service. The Supplier should begin bidding to provide Regulation Service for all hours that the Resource is capable of providing the service.
- The testing window will be open for a calendar week. Qualification requires that the unit bid Regulation Service such that it get scheduled within a calendar week, for 24 hours, including at least two four-hour periods, one that spans the morning pick up from hour beginning 5:00 through hour beginning 8:00 and the other that spans the evening load drop off from hour beginning 19:00 through hour beginning 22:00. The participant must bid into the Day-Ahead or Real-Time Market the maximum Regulation Service capability that wish to qualify. This value must be the lesser of the Regulation Capacity response rate * 5 minutes or the Operating Capacity of the unit.
- The NYISO may not require a retest of Regulation Service providers that do not meet the scheduling criteria defined in the qualification test, through reasons beyond their control, if the NYISO determines sufficient information on the performance of their unit is available from the test results actually achieved.
- Stakeholder Services will coordinate with Operations at the end of the test period to obtain the results of the test.
- A time weighted Performance Index greater than or equal to .85 must be demonstrated over the calendar week period in order to pass the prequalification test.

Given the metering latency issue that may exist for LESR devices, the Performance Index methodology for passing the prequalification test will not be the only measure used by Stakeholder Services. The NYISO may request metering records of and engage in consultation with the LESR for this analysis.

- Actions in the event of a failed pre-qualification test
    1. Stakeholder Services will complete all standard audit documentation as defined in Attachment D of this Manual.
    2. Stakeholder Services will notify the customer indicating the results of the test.
    3. Stakeholder Services will remove all regulation bidding privileges.
    4. Stakeholder Services will forward the test results to Market Mitigation and Analysis (MMA).
    5. Prior to requesting a re-test the test participant must provide an explanation to MMA describing the cause of the failed prequalification test.
    6. Market Mitigation and Analysis will notify Stakeholder Services when the test participant is authorized to perform another test.
- Test participants will be paid for all Regulation Service provided during the test as if the participant was a qualified Regulation Service Supplier.

The test participant will be responsible for any balancing payments due to poor performance during the test.

4.11.3. Supplier Regulation Service Performance Audit

All Generators and Demand Side Resources that bid Regulation Service into the NYISO markets may be requested to demonstrate their ability to achieve an acceptable Regulation Service response. The NYISO may conduct a performance audit of an individual Generator or Demand Side Resource at any time and without prior notification.

- The audit time period is defined as a calendar month.
- Regulation Service Suppliers with a time weighted Performance Index for the period chosen that is less than .85 will be referred to MMA for review. As with the pre-qualification test described in Section 4.11.2, the NYISO may review other data for LESRs in performing the audit analysis.

Suppliers who fail an audit, after consultation with MMA, may be subject to disqualification from participation in the Regulation Market. The procedure for notifying suppliers in the event that they fail an audit is as follows:

NYISO Actions

The NYISO shall:

- Notify the poor performing supplier via telephone or E-mail, upon determination by the NYISO that the supplier has failed an audit.
- Notify the Supplier that it is currently responsible for balancing Regulation Service market payments as described in *NYISO Services Tariff* Rate Schedule 3 and the *NYISO Accounting and Billing Manual* (available from the NYISO Web site at http://www.nyiso.com/public/documents/manuals/administrative.jsp), and that persistent non-compliance in accordance with this procedure may result in the provider being removed from the bidders list.

Market Mitigation and Analysis will review the individual cases of suppliers that fail an audit and will notify Stakeholder Services if they determine that the Supplier should no longer be qualified to bid Regulation Service.

Market Mitigation and Analysis can require that the Regulation Service provider perform a prequalification test once the Supplier has reported that it has addressed the cause of the poor performance.

Regulation Service Provider Actions

The Regulation Service Supplier shall acknowledge the NYISO notification and report its expectation of the time it will be able to return to normal performance. The provider shall

also describe the cause of its poor performance. This notification should be sent to the following e-mail address:

Reference_Price_Update@NYISO.com

Subject line of the e-mail should state "Regulation Service Performance Audit."

If the Supplier has its qualified to bid Regulation Service status changed to not qualified to bid then the Supplier will be required to complete a prequalification test prior to being reinstated in the market.

5. Energy Imbalance Service

This section describes the energy imbalance service.

5.1. Description

Energy imbalance service falls into the following categories:

- ***Internal Energy Imbalance under the* NYISO Services Tariff** – All internal Energy imbalances for Transmission Customers taking service under the *NYISO Services Tariff* are addressed through the Real-Time Market and through the Real-Time Settlement process. All scheduled withdrawals and injections, including deviations from Bilateral Transaction schedules by Transmission Customers taking service under the *NYISO Services Tariff*, are subject to the Real-Time Settlement. Refer to the *NYISO Accounting and Billing Manual* (available from the NYISO Web site at http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsphttps://www.nyiso.com/manuals-tech-bulletins-user-guides) for the description of charges associated with internal energy imbalances. Generators, LSEs and Transmission Customers with imbalances may also be subject to charges for Regulation and Frequency Response Service.
- ***Internal Energy Imbalance Under the* NYISO OATT** – All internal energy imbalances for Transmission Customers taking service under the *NYISO OATT* and not under the *NYISO Services Tariff* shall, when the Transmission Customer's actual energy withdrawals are less than its scheduled energy delivery, pay to the NYISO an amount equal to the greater of 150% of the Real-Time LBMP at the point of delivery or $100/Mwh. If the Transmission Customer's actual energy delivery exceeds its actual energy withdrawals, it will not be paid for the excess energy.
- ***External Energy Imbalance*** – External energy imbalance refers to the mismatch between scheduled and actual flows between the NY Control Area and other Control Areas. Inadvertent energy accounting is implemented according to existing NERC guidelines. Monthly internal/external meter corrections are also accounted for. Any increase or decrease in costs resulting from pay back of accumulated inadvertent interchange is included in the NYISO Scheduling, System Control, and Dispatch Service Charge.

The NYISO is responsible for providing this service.

5.2. External Imbalances

The NYISO performs the following for External inadvertent interchange:

- accurately accounts for inadvertent Energy interchange, through daily schedule verification and the use of reliable metering equipment.
- minimizes unintentional inadvertent accumulation in accordance with NERC and NPCC policies.

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- minimizes accumulated inadvertent Energy balances in accordance with NERC and NPCC policies.

The NYISO reduces accumulated External inadvertent Energy balances by one or both of the following methods:

- scheduling interchange payback with another Control Area as an interchange schedule between Control Areas.
- unilaterally offsetting the tie-line interchange schedule when such action will assist in correcting an existing time error.

External inadvertent interchange accumulated during On-Peak hours is paid back during On-Peak hours. Inadvertent interchange accumulated during Off-Peak hours is paid back during Off-Peak hours. In either case, payback is made with Energy "in-kind."

The Energy Imbalance consists of calculations and inadvertent interchange reports that are produced on an hourly, daily, and monthly basis. The *NYISO Accounting and Billing Manual* (available from the NYISO Web site at the following URL: ~~http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp~~https://www.nyiso.com/manuals-tech-bulletins-user-guides) gives a detailed description.

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The payback process for inadvertent interchange between the NY Control Area and its neighboring control areas is covered in the *NYISO Transmission and Dispatching Operations Manual* (available from the NYISO Web site at the following URL: ~~http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp~~https://www.nyiso.com/manuals-tech-bulletins-user-guides)

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5.3. Monthly Meter Reading Adjustments

The meter reading adjustment process is discussed in the *NYISO Accounting and Billing Manual* (available from the NYISO Web site at the following URL: ~~http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp~~https://www.nyiso.com/manuals-tech-bulletins-user-guides).

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6. Operating Reserve Service

6.1. Description

Operating Reserve service provides backup generation and/or demand response in the event that the NYISO experiences a real time power system Contingency requiring emergency corrective action. In order for the New York Control Area (NYCA) to respond in a timely fashion, the reserves must be available from Generators or Demand Side Resources located within the NYCA and within specific regions, as required by the NYSRC ~~or~~ and other applicable reliability standards.

Types of Operating Reserves

- ***10-Minute Spinning Reserve*** – Operating Reserves provided by qualified Generators, qualified Energy Storage Resources ~~,~~ and qualified Demand Side Resources located within the NYCA that are already synchronized to the NYS Power System and can respond to instructions from the NYISO to change output level within 10 minutes. Spinning reserve may not be provided by Behind-the-Meter Net Generation Resources that are comprised of more than one generating unit that are dispatched as a single aggregate unit.
- ***10-Minute Non-Synchronized Reserve (10-Minute NSR)*** – Operating Reserves provided by Generators that can be started, synchronized, and loaded within 10 minutes. ~~These reserves are carried on quick-start units, such as jet engine type gas turbines.~~ Operating Reserves may also be provided by Demand Side Resources where the demand response is provided by a Local Generator or by Behind-the-Meter Net Generation Resources that are comprised of more than one generating unit that are dispatched as an aggregate unit.
- ***30-Minute Spinning Reserve*** – Operating Reserves provided by qualified Generators, qualified Energy Storage Resources ~~,~~ and qualified Demand Side Resources except Behind-the-Meter Net Generation Resources that are comprised of more than one generating unit and dispatched as a single aggregate unit located within the NYCA that are already synchronized to the NYS Power System and can respond to instructions from the NYISO to change output level within 30 minutes.
- ***30-Minute Non-Synchronized Reserve (30-Minute NSR)*** – Operating reserves that can be provided by Generators, Behind-the-Meter Net Generation Resources that are comprised of more than one generating unit that are dispatched as an aggregate unit, that can be started, synchronized, and loaded within 30 minutes. Operating Reserves may also be provided by Demand Side Resources where the demand response is provided by a Local Generator.
- ***Total 10-Minute Reserve*** – The sum of the 10-Minute Spinning Reserve and 10-Minute
  NSR. [NERC defines this as Contingency Reserve]

- ***Total 30-Minute Reserve*** – The sum of the 30-minute Spinning Reserve and 30-Minute NSR provided by Generators and Demand Side Resources that respond to instructions to change output or provide a demand reduction within 30 minutes.
- ***Total Operating Reserve*** – The sum of the total 10-minute reserve and the total 30-minute reserve. [The NERC definition of operating reserve includes regulation]

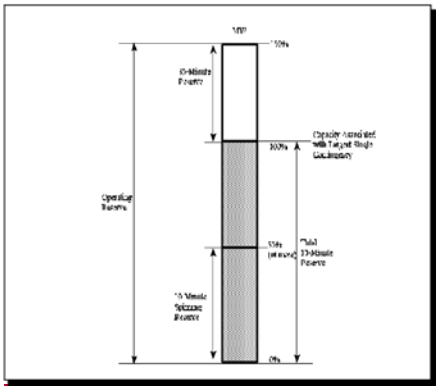
Minimum Operating Reserve Requirement

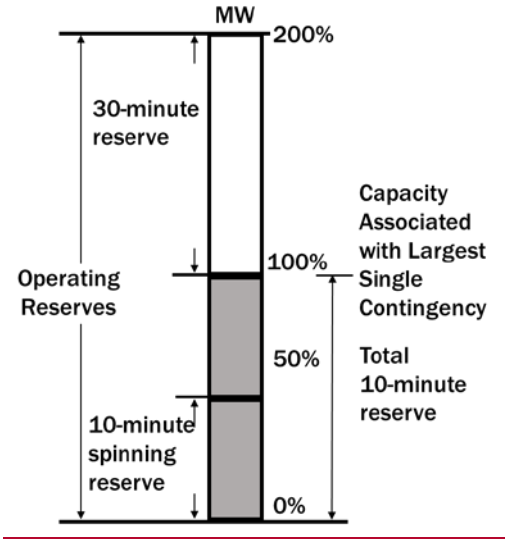
The NYCA's Operating Reserve requirements are:

- Total Operating Reserve must be greater than or equal to ~~one and one-half times~~twice the largest single Contingency (in MW) as defined by the NYISO;
- Total 10-Minute Reserve must be greater than or equal to the largest single Contingency (in MW) as defined by the NYISO;
- 10-Minute Spinning Reserve must be greater than or equal to one-half of the largest single Contingency (in MW) as defined by the NYISO.
- Figure 12 illustrates these requirements. At all times sufficient total 10-minute reserve is maintained to cover the energy loss due to the most severe Normal Transfer Criteria contingency within the NYCA or the energy loss caused by the cancellation of an interruptible import transaction (neighboring control area to NYCA) whichever is greater. In addition:
    - The NYISO may establish additional categories of Operating Reserves if necessary to ensure reliability.
    - The NYISO ensures that providers of Operating Reserves are properly located electrically so that transmission constraints resulting from either commitment or dispatch of units do not limit the ability to deliver Energy to Loads in the case of a Contingency.
    - The NYISO ensures that Capacity counted toward meeting NYCA Operating Reserve requirements is not counted toward meeting Regulation and Frequency Response Service requirements.

Figure 12: Operating Reserve Requirements

Figure 12: Operating Reserve Requirements





6.2. General Responsibilities and Requirements

The NYISO is responsible for scheduling the Operating Reserve service. The NYISO ensures that Operating Reserve is properly geographically located so that transmission constraints do not limit the ability to deliver Operating Reserve. Reserve suppliers receive both a Day-Ahead and a RealTime schedule. The Real-Time schedule may differ from the Day-Ahead schedule. Reserve suppliers must specify a Day-Ahead availability bid for each category of reserve. The Real-Time availability bid is automatically set to zero for each category of reserve and cannot be changed by a reserve supplier. Figure 13 summarizes supplier eligibility to provide ancillary services of reserve and regulation.

~~Figure 13~~

Figure 13: Ancillary Service Eligibility

	Ancillary Service				
Unit Type	**10-S**	**10-NS**	**30-S**	**30-NS**	**Reg**
Flexible (on-dispatch) Start-up time greater than 30 minutes Not block loaded	✔	no	✔	no	✔
Flexible (on-dispatch) 10-minute start Not block loaded	✔	✔	✔	no	✔
Flexible (on-dispatch) 10-minute start Block loaded (no dispatchable range)	no	✔	no	no	no
Flexible (on-dispatch) 30-minute start Not block loaded	✔	no	✔	✔	✔
Flexible (on-dispatch) 30-minute start Block loaded (no dispatchable range)	no	no	no	✔	no
Fixed (off-dispatch)	no	no	no	no	no

6.2.1. NYISO Responsibilities

The NYISO shall procure on behalf of its Customers a sufficient quantity of Operating Reserve products to comply with the Reliability Rules and with other applicable reliability standards. To the extent that the NYISO enters into Operating Reserve sharing agreements

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with neighboring Control Areas its Operating Reserves requirements shall be adjusted accordingly.

The NYISO shall define requirements for Spinning Reserve, which may be met only by Suppliers that are eligible to provide Spinning Reserve; 10-Minute Reserve, which may be met by Suppliers that are eligible to provide either Spinning Reserve or 10-Minute Non-Synchronized Reserve; and 30-Minute Reserve, which may be met by Suppliers that are eligible to provide any Operating Reserve product. The NYISO shall also define locational requirements for Spinning Reserve, 10Minute Reserve, and 30-Minute Reserve located East of Central-East, in Southeastern New York, in New York City, and on Long Island as shown in the web document link below.

~~http://www.nyiso.com/public/webdocs/market_data/reports_info/nyiso_locational_reser~~

https://www.nyiso.com/documents/20142/3694424/nyiso_locational_reserve_reqmts.pdf/ab6e7fb9-0d5b-a565-bf3e-a3af59004672 ~~ve_reqmts.pdf~~

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In addition to being subject to the preceding limitations on Suppliers that can meet each of these requirements, the requirements for Operating Reserve located East of Central East may only be met by eligible Suppliers that are located East of Central East, the requirements for Operating Reserve located in Southeastern New York may only be met by eligible Suppliers that are located in Southeastern New York, requirements for Operating Reserve located in New York City may only be met by eligible Suppliers that are located in New York City, and requirements for Operating Reserve located on Long Island may only be met by eligible Suppliers located on Long Island. Each of these Operating Reserve requirements shall be defined consistent with the Reliability Rules and other applicable reliability standards. The NYISO shall select Suppliers of Operating Reserves products to meet these requirements, including the locational Operating Reserves requirements, as part of its overall co-optimization process.

The NYISO shall select Operating Reserves Resources that are properly located electrically so that all locational Operating Reserves requirements are satisfied, and so that transmission constraints resulting from either the commitment or dispatch of Resources do not limit the NYISO's ability to deliver Energy to Loads in the case of a Contingency. The NYISO will ensure that Suppliers that are compensated for using Capacity to provide one

Operating Reserve product are not simultaneously compensated for providing another Operating Reserve product, or Regulation Service, using the same Capacity.

6.2.2. Supplier Eligibility Criteria

The NYISO shall enforce the following criteria, which define which types of Generators or Demand Side Resources are eligible to supply particular Operating Reserve products.

Spinning Reserve – Generators or Demand Side Resources that are not supporting their Demand

Reduction through the use of Local Generation that are ISO-Committed Flexible or Self-Committed

Flexible; are operating within the dispatchable portion of their operating range (which for offers by

BTM:NG Resources corresponds to quantities in excess of its Host Load and subject to its Injection Limit); and are capable of responding to NYISO instructions to change their output level within ten minutes, shall be eligible to supply Spinning Reserve. Behind-the-Meter Net Generation Resources that are comprised of more than one generating unit that are dispatched as a single aggregate unit are not qualified to provide Spinning Reserves. Energy Storage Resources that are capable of responding to NYISO instructions to change their output level within ten minutes, shall be eligible to supply Spinning Reserve

10-Minute Non-Synchronized Reserve – (i) Off-line Generators that are capable of starting, synchronizing, and increasing their output level within ten (10) minutes, (ii) Behind-the-Meter Net Generation Resources that are comprised of more than one generating unit that are dispatched as a single aggregate unit that are capable of increasing their output level within ten (10) minutes, and (iii) Demand Side Resources, that are supporting their demand reduction through the use of Local Generators and are capable of reducing their Energy usage within ten (10) minutes, shall be eligible to supply 10-Minute Non-Synchronized Reserve.

30-Minute Reserve (spinning and non-synchronized) – (i) Energy Storage Resources will be eligible to provide 30-Minute spinning reserve. Generators, except Behind-the-Meter Net Generation Resources that are comprised of more than one generating unit and dispatched as a single aggregate unit, that are ISO-Committed Flexible or Self-Committed Flexible and operating within the dispatchable portion of their operating range and Demand Side Resources that are not supporting their Demand Reduction through the use of Local Generation that are ISO-Committed Flexible or Self-Committed Flexible and operating within

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the dispatchable portion of their operating range, shall be eligible to supply synchronized 30-Minute Reserves. (i) Off-line Generators that are capable of starting, synchronizing, and increasing their output level within thirty (30) minutes, (ii) Behind-the-Meter Net Generation Resources that are comprised of more than one generating unit and dispatched as a single aggregate unit that are capable of increasing their output level within thirty (3) minutes, and (iii) Demand Side Resources that are supporting their demand reduction through the use of Local Generators that are capable of starting, synchronizing, and increasing their output level within thirty minutes, shall be eligible to supply non-synchronized 30-Minute Reserves.

Self-Committed Fixed and ISO-Committed Fixed Generators – Shall not be eligible to provide any kind of Operation Reserve.

6.2.3. Other Supplier Requirements

All Suppliers of Operating Reserve must be located within the NYCA and must be under NYISO Operational Control. Each Supplier bidding to supply Operational Reserve or reduce demand must be able to provide Energy or reduce demand consistent with the Reliability Rules and the NYISO Procedures when called upon by the NYISO. All Suppliers that are selected to provide Operating Reserve shall ensure that their Resources maintain and deliver the appropriate quantity of Energy, or reduce the appropriate quantity of demand, when called upon by the NYISO during any interval in which they have been selected. For Suppliers engaged in Dual Participation, the total Energy and Operating Reserves that can be provided shall account for the Supplier's obligation(s) to the distribution or other entity.

Generators or Demand Side Resources that are selected to provide Operating Reserve in the Day-Ahead Market or any supplemental commitment may not increase their Energy Bids or
Demand Reduction Bids for portions of their Resources that have been scheduled through those processes, or reduce their commitments, in Real-Time except to the extent that they are directed to do so by the NYISO. Generators and Demand Side Resources may enter into alternate sales arrangements utilizing any Capacity that has not been scheduled to provide Operating Reserve.

6.2.3.1. Requirements for Demand-Side Ancillary Service Program (DSASP) Resources

A DSASP Resource that meets Supplier Eligibility Criteria in Section 6.2.2 of this manual may register with the NYISO to supply Operating Reserves and Regulation service in

accordance with the procedures below. DSASP Resources may provide either Spinning Reserves and Regulation service or Non-Synchronized Reserves, but not both. A DSASP Resource may be an individual Demand Side Resource located at a single location with a unique distribution utility account number (individual DSASP Resource) or a group of one or more individual Demand Side Resources, each with its own unique distribution utility account number (grouped DSASP Resource). Pregrouping of individual Demand Side Resources for enrollment into the Demand Response Information System (DRIS) is not permitted for DSASP Resources.

The DSASP Provider enrolls and registers the DSASP Resource. A DSASP Provider is required to identify all Demand Side Resources that are part of an individual or grouped DSASP Resource through the DRIS enrolled and MIS registration processes. A DSASP Provider is required to maintain its DSASP Resources in DRIS, including reporting any changes to the enrolled Demand Side Resource or Resources that comprise the DSASP Resource. These changes may include, but are not limited to, changes in capability of a Demand Side Resource or changes in the number or type of Demand Side Resources that make up the DSASP Resource.

6.2.3.2. DSASP Provider Responsibilities

A DSASP Provider is a NYISO Customer that has completed the DSASP Provider Registration Packet and received confirmation of such from the NYISO Member Relations Department. A DSASP Provider may elect to register DSASP Resources that receive the NYISO's dispatch signals through the Transmission Owner or via Direct Communication with the NYISO.

In addition to being the DSASP Resource's point-of-contact with the NYISO, the DSASP Provider also has the following additional responsibilities:

- The DSASP Provider is responsible for DSASP Resource performance and all market obligations related to that performance.
- The DSASP Provider is responsible, per Attachment B of the DSASP Resource Registration Packet to obtain authorization from each Demand Side Resource allowing the DSASP Provider to act on behalf of the Demand Side Resource. The authorization must specify that the DSASP Provider has authority to participate in the DSASP program, act as an

  organization of record for all financial transactions, and shall be signed by an authorized representative of the Demand Side Resource. Upon request, the DSASP Provider shall provide such authorization to the NYISO promptly and, if a date is specified by the NYISO in the request, such information must be received by the NYISO on or before the date.

A DSASP Provider that chooses to communicate directly with the NYISO:

- Communicates directly with the NYISO for any DSASP Resource it has registered and enrolled in DSASP.
- Is responsible for communications infrastructure between itself and the NYISO in accordance with the Direct Communications Procedure.
- Is responsible for communications infrastructure to send dispatch signals to DSASP Resources under its control and obtain telemetry from DSASP Resources under its control.
- Schedules ICCP communication outages based on the Direct Communications Procedure.
- Schedules computer control system outages for DSASP Resources under its control based on Control Center Requirements Manual.
- Schedules DSASP Resource outages based on the Outage Scheduling Manual.
- Uses voice communications with NYISO to address communication outages or issues with operational performance of DSASP Resources, including any temporary derate of the operating capability of the DSASP Resources.
- Is responsible for the immediate repair of its circuits and/or communication system. If communications problems are detected, the owner of the physical or private virtual circuit has the responsibility to resolve those problems with the appropriate carrier or party.
- Assumes all responsibility for accepting NYISO scheduling and dispatch, communicating to the DSASP Resource how to perform to follow the NYISO dispatch, and providing telemetry back to the NYISO that indicates how its DSASP Resource has responded to the NYISO dispatch.
- Is at all times responsible for design and operation of the metering infrastructure between itself and the Demand Side Resources it has enrolled to participate as a DSASP Resource.

Registration and Technical Specifications for DSASP Providers Electing NYISO Direct Communication are available in Section 6.2.4 of this manual.

The metering accuracy shall be in accordance with requirements of the:

- NYISO Control Center Requirements Manual
- NYISO Revenue Metering Requirements Manual

A DSASP Provider that communicates directly with the NYISO for dispatch of any DSASP Resources is required to maintain 24/7 on-call communications and operations contacts that are able to take actions and provide information requested by the NYISO. In the event of a loss of communications with the NYISO, the DSASP Provider is required to follow the last base-point instruction it received for its DSASP Resources until communication is re-established or as directed by NYISO Operators.

6.2.3.3. Interaction with other NYISO Demand Response Programs

Demand Side Resources enrolling to provide Operating Reserves and/or Regulation service, either individually or as part of a grouped DSASP Resource, may be jointly enrolled in DSASP and one reliability demand response program, the Emergency Demand Response Program (EDRP) or the Special Case Resource (SCR) program, but not both. Demand Side Resources enrolled in the Day-Ahead Demand Response Program are not eligible to jointly enroll in the Demand Side Ancillary Service Program.

6.2.3.4. Participation Requirements of Demand Side Resources Grouped as a DSASP Resource

All individual Demand Side Resources in the grouped DSASP Resource must be located within the same load zone and have a grouped total of at least 1 MW of load reduction capability for both Summer and Winter Capability Periods. Demand Side Resources must be enrolled with the required DRIS Response Type for the type of Operating Reserves that the grouped DSASP Resource is registered to provide:

- In order to provide Spinning Reserves and Regulation Service a grouped DSASP Resource may only be comprised of Demand Side Resources enrolled in DRIS as Response Type C and have the ability to interrupt the curtailable load without shifting any load to a Local Generator, other behind-the-meter generator or any other behind-the-meter supply resource.
- A grouped DSASP Resources comprised of Demand Side Resources enrolled in DRIS as Response Type B, C with a Local Generator, other behind-the-meter generator or any other behind-the-meter supply resource and/or G may provide Non-Synchronized Reserves.

Each DSASP Provider is limited to two grouped DSASP Resources per load zone, based on the ancillary service product(s) provided: one grouped DSASP Resource that supplies Spinning Reserves and Regulation Service; and one grouped DSASP Resource that supplies Non-Synchronized Reserves. A DSASP Provider may not enroll a second grouped DSASP Resource of the same type within the same load zone.

6.2.3.5. Participation Requirements of an Individual Demand Side Resource enrolled as a DSASP Resource Individual Demand Side Resources with at least 1 MW of load reduction capability for both

Summer and Winter Capability Periods may enroll as a DSASP Resource that is not grouped. A

Demand Side Resource must be enrolled with the required DRIS Response Type for the type of Operating Reserves that the individual DSASP Resource is registered to provide:

- In order to provide Spinning Reserves and Regulation Service, an individual DSASP Resource may only be enrolled in DRIS as Response Type C and have the ability to interrupt the curtailable load without shifting any load to a Local Generator, other behind-the-meter generator or any other behind-the-meter supply resource
- An individual DSASP Resource enrolled in DRIS as (i) Response Type B, C with a Local Generator, other behind-the-meter generator or any other behind-the-meter supply resource; or (ii) Response Type G, may provide Non-Synchronized Reserves

A DSASP Resource that is an individual Demand Side Resource may not be converted to a grouped DSASP Resource by adding additional Demand Side Resources to the DSASP Resource. The individual Demand Side Resource may, however, withdraw its market participation as an individual DSASP Resource and enroll and register the Demand Side Resource as a member of a grouped DSASP Resource.

6.2.3.6. Enrolling Demand Side Resources into the Demand-Side Ancillary Service Program

A two-step enrollment and registration process is required for all DSASP Resources. Enrollment of individual Demand Side Resources occurs through the DRIS, which verifies eligibility of the individual Demand Side Resources that make up the individual or grouped DSASP Resource and produces the detailed DSASP Resource Report. The DSASP Resource Report is used as part of the DSASP Resource Registration Packet. The registration process involves reporting additional information necessary to establish a DSASP Resource as a supplier in the MIS and the network model to allow for participation of the DSASP Resource in NYISO's Ancillary Services market. A DSASP Provider is required to meet and maintain all market requirements for its resources that shall participate in the NYISO's Ancillary Services market.

6.2.3.6.1. Enrollment via DRIS

A DSASP Provider enrolls all individual Demand Side Resources through a DSASP import into the Demand Response Information System (DRIS), whether or not the Demand Side Resource will be registered as an individual DSASP Resource or as a part of a grouped DSASP Resource. Enrollment or changes to a DSASP Resource may occur at any time. All Demand

Side Resources that are enrolled in DSASP are required to provide operational limits for the Summer and Winter Capability Periods at the time of enrollment and additional enrollment criteria as defined in the DRIS import file.

Upon completion of a DSASP import to initially enroll or change a DSASP Resource, the DRIS will produce a report for exceptions or errors that occurred during the import. Once the DSASP Provider takes action to submit the enrollment or updates of individual Demand Side Resources to the DSASP Resource, the DRIS shall produce a detailed DSASP Resource Report for each individual or grouped DSASP Resource.

6.2.3.6.2. Registration in MIS

A DSASP Provider is required to complete a DSASP Resource Registration Packet for each new DSASP Resource. The detailed DSASP Resource Report from the DRIS is a required form that must accompany the DSASP Resource Registration Packet. The DSASP Provider submits the completed DSASP Resource Registration Packet to the NYISO Member Relations Department for processing.

The NYISO Member Relations Department shall process the DSASP Resource Registration Packet according to its procedures. Upon satisfaction by the DSASP Provider of all registration requirements, the DSASP Resource information shall be sent to System Operations for modeling as a supplier in the network model. System Operations shall provide a DSASP point identifier (PTID) to NYISO Member Relations Department. NYISO Member Relations Department shall complete the DSASP Resource registration set up in MIS. Once all market requirements have been met, the NYISO Member Relations Department shall notify the DSASP Provider that the new DSASP Resource PTID is now available in MIS for communications and prequalification testing.

6.2.3.7. Modeling of DSASP Resources

An individual DSASP Resource must fully meet all participation requirements of DSASP and shall be modeled at the physical load bus that connects the Demand Side Resource to the NYISO system.

Grouped DSASP Resources must fully meet the participation requirements of DSASP and shall be modeled at the load bus specified below for each NYISO load zone:

Load Zone Identifier	MIS Load Zone Name	Station

A	WEST	PACKARD_115
B	GENESE	S42_115
C	CENTRL	SOLVAY_115
D	NORTH	ALCOA_PA 115
E	MHK VL	EDIC_PTR_115
F	CAPITL	PATROON_115
G	HUD VL	ROCKTVRN_115
H	MILLWD	MILLWOOD_138
I	DUNWOOD	DUNWODIE_138
J	N.Y.C	E13THSTA_69_
K	LONGIL	BRENTWOD_69_

The NYISO may modify modeling criteria applied to a grouped DSASP Resource at any time, if necessary for reliability.

6.2.3.8. Communication Requirements for DSASP Resources

Full telemetry is required for DSASP Resources. For direct communication with the NYISO, refer to the NYISO's Direct Communication Manual. Alternatively, for communication through a Transmission Owner, contact the Transmission Owner in the load zone of the DSASP Resource for its communication requirements.

6.2.3.9. Limit on Direct Communication for DSASP Resources

The NYISO has established a NYCA-wide limit of 200 MW for DSASP Resources using Direct Communications in order to limit the exposure of the amount of Operating Reserves that is not under Transmission Owner control during Interim Control Operations. The NYISO will use the
Normal Upper Operating Limit (UOLN) of each qualified DSASP Resource to monitor the limit. As DSASP Resources using Direct Communications complete their qualification process, the NYISO will provide periodic updates on the MW applied to the limit.

6.2.3.10. Changes to Enrolled and Registered DSASP Resources

All changes to DSASP Resources are required to be reported through an import to the DRIS. Additional requirements for changes to limits for the Capability Periods are described below.

6.2.3.10.1. Changes to Individual Demand Side Resources Within a Grouped DSASP Resource

Any change in individual resources in a grouped DSASP Resource must be reported through an import to DRIS before the individual Demand Side Resources are eligible to participate as part of the DSASP Resource, even when the net change to the limits of the grouped DSASP Resource is zero. After reporting the change into DRIS via the DSASP import, the DRIS shall produce a revised version of the DSASP Resource Report showing the changes in individual Demand Side Resources, and limits of the DSASP Resource, if applicable. The DSASP Provider is required to submit the updated DSASP Resources Report from DRIS to the NYISO Member Relations Department. If there are any changes to Capability Limits of the grouped DSASP Resource resulting from the changes to individual Demand Side Resources that make up the DSASP Resource, the DSASP Provider is required to follow the procedures below for changes to limits. If the change in individual Demand Side Resources in a grouped DSASP Resource results in a season with a Capability Limit of less than 1 MW, the DSASP Provider shall be notified by NYISO Member Relations Department that the DSASP Resource is not eligible to continue market participation until it has the minimum capability of 1 MW in each season.

6.2.3.10.2. Changes to Limits for the Capability Periods of a DSASP Resource

When changes to individual Demand Side Resources result in changes to the limits of a grouped DSASP Resource, or a DSASP Resource that is a single Demand Side Resource elects to change its limits, the DSASP Provider is required to report the information through an import to DRIS and provide an updated DSASP Resource Report from DRIS to NYISO Member Relations Department. NYISO Member Relations Department shall process the DSASP Resource Report and notify the DSASP Provider of any additional market participation requirements. If the DSASP Resource Report indicates a reduction in Capability Limits, the DSASP Provider may begin using the reduced value for its offers. Failure to offer at the reduced value may result in lower performance. At a minimum, all DSASP Resources must maintain a minimum of 1 MW of Operating Capacity (load reduction capability) for both the Summer and Winter Capability Periods. If the DSASP Resource is a group of Demand Side Resources, the DSASP Provider must ensure that the 1 MW minimum Summer and Winter Operating Capacity is maintained through management of the individual Demand Side Resources. The DSASP Provider may continue to offer the DSASP Resource at the levels prior

to the submission of the change request until it is notified by the NYISO Member Relations Department that the limits of the DSASP Resource have been changed. NYISO System Operations shall be advised of changes to Capability Limits of DSASP Resources. If necessary for reliability, model changes may be required for requested changes to limits of DSASP Resources. The DSASP Provider may not offer any increased capability of the DSASP Resource until it receives confirmation from the NYISO Member Relations Department.

6.2.3.11. Metering and Measurement of Grouped DSASP Resources

Totalization of real-time metered load for information provided by a DSASP Provider to, or collected from, its DSASP Resources for each dispatch interval to NYISO via direct communications must include all of the individual Demand Side Resources enrolled as part of the DSASP Resource (PTID), regardless of how the DSASP Provider instructs the individual Demand Side Resources to meet the dispatch instruction. The DSASP Resource's performance is based on the combined instantaneous metered load of all resources in the grouped DSASP Resource. Totalization methodology and meter data management are required in the Infrastructure and Technology Plan in the DSASP Provider Registration Packet.

The DSASP Provider is required to update the totalization of the real-time metered load for the affected DSASP Resource to reflect any changes to the individual Demand Side Resources within 48 hours of receiving notice of acceptance of such change by the NYISO.

The NYISO requires the DSASP Provider to retain all real-time interval meter data from each individual Demand Side Resource that is a member of a grouped DSASP Resource or individually registered DSASP Resources that receive dispatch instructions via direct communication with the NYISO for a period of six years. Data retention is a requirement of the Infrastructure and Technology Plan in the DSASP Provider Registration Packet. At any time, the NYISO may request instantaneous interval meter data for Demand Side Resources that are part of a grouped DSASP Resource or individually registered DSASP Resources that receive dispatch instructions via direct communication with the NYISO.

6.2.4. Registration and Technical Specifications for DSASP Providers Electing NYISO Direct Communications

This section provides the registration, technical specifications and requirements for establishing direct communication between NYISO and a DSASP Provider. These technical specifications and requirements do not apply when communication is established through

the Transmission Owner, where the technical requirements of the Transmission Owner apply.

6.2.4.1. Establishing Direct Communications with the NYISO

To establish Direct Communications with the NYISO, the DSASP Provider must:

1. Become a NYISO Market Participant by completing the NYISO Customer Registration Packet.
2. Complete DSASP Provider Registration Packet.
3. Contact NYISO Stakeholder Services to request Direct Communications with the NYISO.
4. Applicable personnel must complete CEII (Critical Energy Infrastructure Information) and NDA (Nondisclosure Agreement). NYISO Stakeholder Services will seek Legal approval to provide the Direct Communications Procedure to the qualified personnel representing the DSASP Provider.
5. After Legal approval, NYISO Stakeholder Services will send the Direct Communications Procedure to the DSASP Provider and notify NYISO IT department that the Procedure has been sent to a DSASP Provider.
6. A DSASP Provider may also request that NYISO Stakeholder Services set up a conference call between the NYISO IT, NYISO Stakeholder Services and the DSASP Provider. NYISO IT will collect the necessary contact information to begin the discussions regarding any questions the DSASP Provider has about the direct communications process, including:
    a. Identify/Configure Communication Network Services,
    b. Identify/Configure Hardware/Software, or
    c. Complete all aspects of the Direct Communications Procedure.

6.2.4.2. DSASP Provider Registration

A current NYISO Market Participant must perform the following to register as a DSASP Provider:

1. A DSASP Provider must register as such with the NYISO, via the DSASP Provider Registration Packet, prior to registering any DSASP Resources via the DSASP Resource Registration Packet.
2. The DSASP Provider Registration Packet requires:
    - A complete list of DSASP Provider Contacts for the DSASP Program, Operations and Communications be provided to the NYISO.
    - A complete Infrastructure and Technology Plan that incorporates the requirements herein and the DSASP Provider Registration Packet be submitted to the NYISO.
3. DSASP Providers that intend to use a third party for communication services, data processing or any other activities related to scheduling and dispatch of DSASP resources are advised to contact NYISO Member Relations to understand any

requirements the third party may have in order to interact with the NYISO on behalf of the DSASP Provider.

- Those DSASP Providers considering the use of a third party provider for these services should refer to the NYISO Customer Registration Packet to complete the Scheduling Service Provider/Agency Agreement Form.
- Refer all questions on completion of the DSASP Provider Registration Packet and the Scheduling Service Provider/Agency Agreement Form to the NYISO Member Relations Department.

6.2.4.3. DSASP Provider Responsibilities

The DSASP Provider has the following responsibilities in regards to the DSASP Resource(s) under the DSASP Providers cognizance with the NYISO:

6.2.4.3.1. DSASP Provider Infrastructure Responsibilities:

The DSASP Provider is responsible for the infrastructure between the NYISO and itself, and the infrastructure between DSASP Provider and its Demand Side Resource(s), including:

- Computer systems used for:
  - Communications with the NYISO,
  - Managing its resources, and
  - Communicating and dispatching its resources
- Resource Metering Infrastructure
  - Metering compliant with the (i) NYISO Meter Services Entity, (ii) Revenue Metering Requirements and (iii) Control Center Requirements Manuals will be used for all instantaneous and billing related devices (RTU not included).
- Voice communications with the NYISO address communication outage or issues of operational performance.

6.2.4.3.2. DSASP Provider Operational Responsibilities

6.2.4.3.2.1. Normal DSASP Provider Communication responsibilities On a normal basis, the DSASP Provider shall maintain communications with the NYISO in accordance with the following:

- Maintain a 24x7 on call communications contact with the NYISO.
- Maintain a 24x7 on call operational contact with the NYISO.
- Ensure these contacts are able to take appropriate actions in the event of a communication or operational issue, as required.

6.2.4.3.2.2. DSASP Provider responsibilities during a Loss of Communications with the NYISO

In the event of a loss of communications with the NYISO, the DSASP Provider shall follow the last basepoint instruction it received from the NYISO for its DSASP Resource(s) at the time the communications was lost until communications are restored, unless otherwise directed by the NYISO.

DSASP Resources dispatched via the DSASP Provider using Direct Communications with the NYISO cannot be dispatched by the respective Transmission Owner during Interim Control Operations (ICO).

The Transmission Owner does not receive any data for the DSASP Resource in the TOs Energy Management System and therefore cannot dispatch the DSASP Resource during ICO.

6.2.4.3.3. DSASP Provider Communication Network Responsibilities

The DSASP Provider is responsible for the following requirements in regards to the communication network between its Demand Side Resources and the NYISO:

- The costs associated with the installation of communication circuit(s) and any monthly charges for those communication circuits.
- The immediate repair of its circuits and/or its communication system including but not limited to the communications to and from its Demand Side Resources to the DSASP Provider's facility(s).
- The DSASP Provider is responsible for the costs of the repairs to the communication system.

6.2.4.4. Registration Requirements Associated with an Infrastructure and Technology Plan

The following information is required to be included in the Infrastructure and Technology Plan provided to the NYISO during the DSASP Provider and/or DSASP Resource Registration Processes:

- System Diagrams
- Wiring Diagrams
- Schematics
- Block Diagrams
- Text documentation

6.2.4.4.1. NYISO Review of the Infrastructure and Technology Plan

The NYISO will review the information provided by the DSASP Provider in the Infrastructure and Technology Plan to assess the plan for completeness.

The DSASP Provider Registration Packet will specify the minimum requirements.

6.2.4.4.2. DSASP Provider responsibilities in regards to the Infrastructure and Technology Plan

The DSASP Provider is financially and operationally responsible for the performance of the DSASP Resource or Resources and all market obligations that are derived from its enrollment of a DSASP Resource in the program.

The Infrastructure and Technology Plan will not be assessed for its technical merit or the feasibility of the system to allow the DSASP Provider to meet NYISO Tariff/Procedure obligations.

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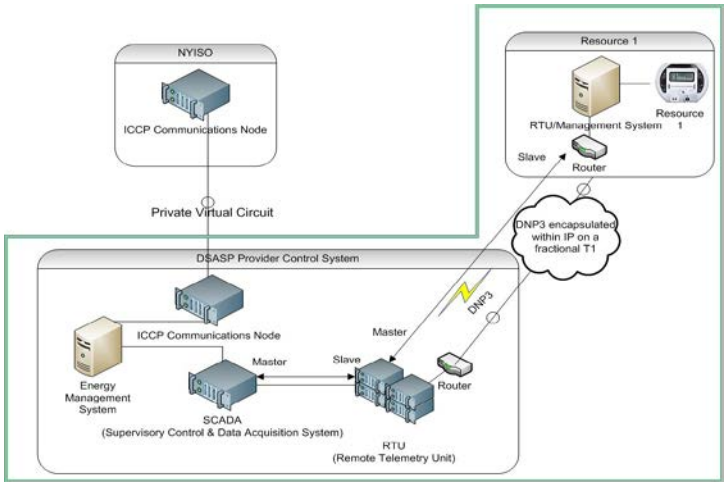
~~Figure 14~~Figure 14: Example of a DSASP Provider with One DSASP Resource Block Diagram



6.2.4.4.3. DSASP Provider Operations/Control Center Configuration

The DSASP Provider shall provide for the following Operations/Control Center configurations requirements in the Infrastructure and Technology Plan:

1. Physical/Cyber Security
   Physical/Cyber security should include, but is not limited to:
   - 24/7/365 physical security management

- Identity and Access Management

2. System Operations Management
   System Operations Management should include, but is not limited to:
   - Availability Management, including Network & Services Management
3. Power Infrastructure
   Power Infrastructure should include, but is not limited to:
   - 100% generator backup, including periodic testing requirements
   - UPS backup power, including periodic testing requirements
   - Grounding in accordance with NFPA 70
4. Environmental Controls
   Environmental Controls should include, but is not limited to:
   - Cooling and humidity management
   - Fire detection and suppression systems
5. Redundancy of Infrastructure
   Redundancy of infrastructure should include, but is not limited to:
   - All servers having redundant power supplies (e.g., UPS, Direct Current power source)
   - All servers and storage arrays utilizing RAID 0,1
   - Server clustering
   - Hot backup database server is available in the event of database server failure.
6. Scalability
   Scalability should include, but is not limited to:
   - Ability of the platform database to be expanded in size
   - Currently XX Terabytes with room to grow to XXX Terabytes.
7. Backup Process
   Backup process should include, but is not limited to:
   - Daily backup of servers and databases.
   - Periodic transactional backups performed between complete backups Backups routinely shipped to a separate storage facility.
8. Disaster Recovery Process
   Disaster recovery process should include, but is not limited to:
   - Hard-Drive failure process
   - Non-mission critical server failure process (e.g., backup domain controller) Database server or disk array failure Primary data center failure.

6.2.4.4.4. DSASP Provider to DSASP Resource Configuration

The DSASP Provider is responsible for providing for the following DSASP Provider to DSASP Resource configuration requirements in the Infrastructure and Technology Plan:

1. Describe the overall system architecture of the DSASP Provider's Energy Management System (EMS) to be employed for management of each Demand Side Resource comprising the DSASP Resource
   - If the EMS is a purchased product or service, identify the product/service and provide OEM contact information for the product/service.
   - If the EMS is internally developed, provide documentation of system functionality in regards to DSASP Resource supervisory control.
2. Describe the communications architecture utilized between the DSASP Provider systems and the DSASP Resource(s) system and/or devices (e.g., RTU, instantaneous meter)
   - Describe the communications with the Demand Side Resource(s), including: o Circuit type and bandwidth o Identify whether shared for other purposes or dedicated o Identify any redundancies
   - Identify communication protocol used for communicating with the DSASP Resource.
   - Describe any meter totalization methodology used for reporting instantaneous data (e.g., processing, timing, calculations)
   - Identify the meter(s) utilized

6.2.4.4.5. DSASP Provider Data Management Practices

The DSASP Provider is responsible for providing for the following Data Management Practices in the Infrastructure and Technology Plan:

1. Data Validation, Estimation, and Editing
   Describe the process and rules to be used for meter data. If using any industry standards, provide a reference to the respective industry standard and how the DSASP Provider is implementing the standard.
2. Data Retention
   Describe the data retention practices, including the data to be retained and the schedule for retention.

6.2.4.5. DSASP Direct Communications Requirements

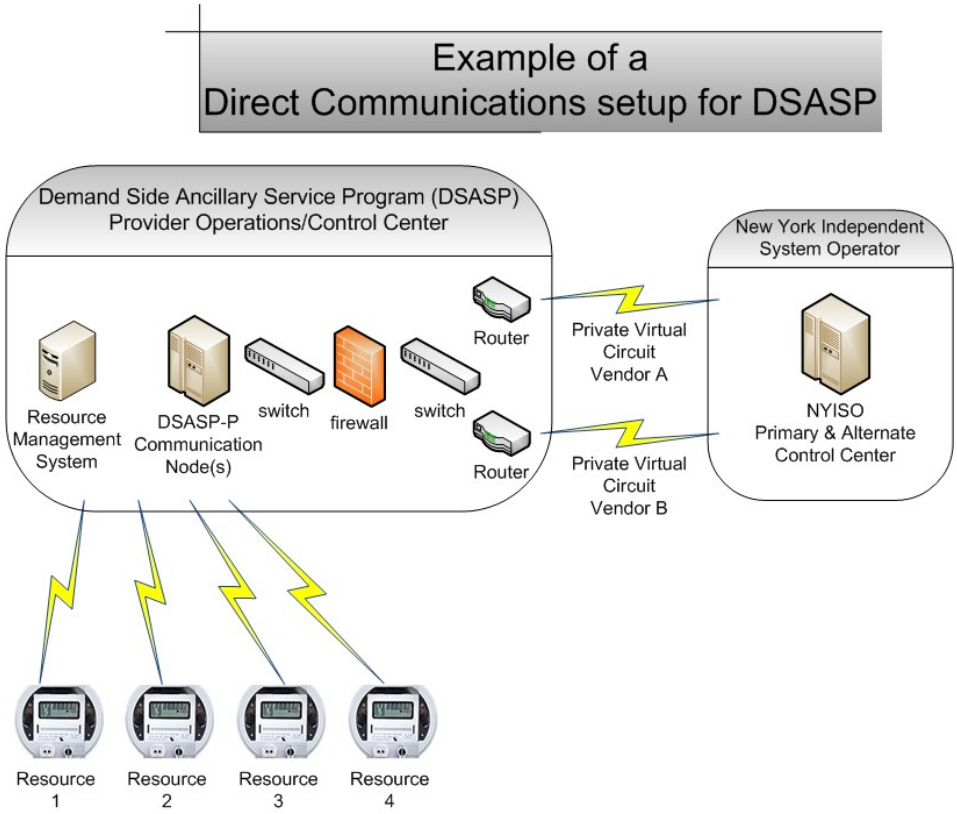
The DSASP Provider is responsible for providing for the following Direct Communication requirements when electing this communication method with the NYISO:

1. Communication Network Requirements
   Communication network redundancy requirements to the NYISO are based on total MWs enrolled in DSASP.
   - Requirement if total enrollment by DSASP Provider is >25 MWs.
     A completely redundant communication configuration is required (recommended for all DSASP Providers, regardless of size), consisting of:

- 2 different communication vendors
- 2 sets of network components
- Minimum of 2 ICCP nodes

- Requirement if total enrollment by DSASP Provider is ≤ 25 MW:
  A single-loop communication configuration is required, consisting of:
  - 1 communications vendor
  - 1 set of network components
  - 1 ICCP node
- The DSASP Provider and the NYISO will jointly complete their respective vendor agreements to establish the direct communications.
  This agreement is required by the vendor to connect the DSASP Provider to the NYISO over the network it manages.

2. Hardware and Software Requirements
   - Contact communication vendor to establish a link to the NYISO Establish a contract with the communications vendor:
     - Select a circuit type and bandwidth
     - Obtain the Virtual Private LAN Service
     - MPLS (Multi-Protocol Label Switching)
   - Identify Communication Network Hardware
     - Router(s) used must be capable of router to router encryption
     - Firewall(s) usage is highly recommended
   - Select the software solution to handle ICCP communication.
     - Software must support Blocks 1 and 2 as both the client and the server.
   - Configure Hardware and Software for ICCP Node.
     - Collaborate with NYISO personnel as necessary to comply with NYISO Direct Communications Procedure (CEII and NDA completion required).
     - Scalable to incorporate additional resources (if applicable).
     - For redundant communications configuration:
       i. Be able to switch communications circuits and/or ICCP Node (e.g., have failover capability)
       ii. The design of the system should be to achieve 99.99% availability.
       iii. Identify servers and other hardware based on requirements from software vendors.



6.2.4.6. Other DSASP Requirements

6.2.4.6.1. Audit/Site Visit

6.2.4.6.1.1. Prequalification Performance Test

The DSASP Provider is responsible to conduct prequalification performance tests in accordance with the following:

- Ancillary Services Manual o Regulation market – Section 4.11 Regulation Service Qualification and
  Performance Criteria o Reserve market – Section 6.12 Reserve Service Qualification and Performance
  Criteria

6.2.4.6.1.2. Performance Audits

As with other suppliers, there will be ongoing performance audits of DSASP Resources based on NYISO Procedures (Manuals, Technical Bulletins).

6.2.4.6.1.3. Documentation/Data/Site audits

The DSASP Provider has the responsibility to maintain DSASP documentation, data and make the resources under the DSASP Provider's cognizance available for site audit.

At the NYISOs discretion, NYISO personnel or its agent may request data, documentation, or conduct an onsite visit to audit the DSASP Provider of its compliance with DSASP requirements.
Audit may include, but is not limited to:

- Infrastructure plan provided by the DSASP Provider
- Procedural /system documents
  i. Business practices for Validation, Editing and Estimation
  ii. Verification of calculations from automated systems
  iii. Data used for settlement in the DSASP program

Access must be provided to ensure compliance with the Demand Side Ancillary Services Program requirements.

6.3. General Day-Ahead Market Rules

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6.3.1. Bidding and Bid Selection

Resources capable of providing Spinning Reserve, 10-Minute Non-Synchronized Reserve, and/or 30-Minute Reserve (spinning and non-synchronized) in the Day-Ahead commitment may submit Availability Bids for each hour of the upcoming day. If a Supplier offers Resources that are capable, based on their indicated commitment status, of providing Operating Reserves but does not submit an Availability Bid, its Day-Ahead bid will be rejected in its entirety. A supplier may resubmit a complete Day-Ahead Bid, provided that the new bid is timely. Refer to Figure 13, on page 43. Availability Bids submitted for Resources engaged in Dual Participation shall reflect the capability available to the wholesale market, accounting for any obligation(s) to a distribution utility or other entity.

Demand Side Resources can be qualified to bid synchronous or non-synchronous reserves, but not both. Demand Side Resources that are qualified to bid synchronous reserves must bid a start up cost of $0 and a minimum generation cost of $0. Demand Side Resources that are qualified to bid non-synchronous reserves may bid a start up cost but the minimum generation cost must be set to $0. Demand Side Resources will not receive a day-ahead

energy schedule but the day-ahead energy bid submitted will be passed to the hour ahead market if the Day-Ahead reserve bid is accepted.
This energy bid will be used by RTD to schedule demand reductions in real time.

Behind-the-Meter Net Generation Resources consisting of a single generating unit and a Host Load are qualified to bid synchronous reserves. Behind-the-Meter Net Generation Resources that are comprised of more than one generating unit and dispatched as a single aggregate unit are qualified to bid 10-Minute Non-Spinning Reserves or 30-Minute Non-Spinning Reserves. Behind the-Meter Net Generation Resources do not bid Minimum Generation MWs, Minimum Generation costs or Start-Up costs.

ESR are only qualified to bid synchronous reserves. ESR do not bid Minimum Generation MWs, Minimum Generation costs or Start-up costs.

The NYISO may schedule Suppliers that make themselves available to provide Operating Reserves up to the following maximum Operating Reserve levels:

1. For Spinning Reserves, the Resource's emergency response rate multiplied by ten.
2. For 10-Minute Non-Synchronized Reserves, or for non-synchronized 30-Minute Reserves, the Resource's UOL_N or UOL_E, whichever is applicable at the relevant time (the Resource may offer one product or the other depending on the time required for it to start-up and synchronize to the grid).
3. For synchronized 30-Minute Reserves, the Resource's emergency response rate multiplied by 20. This represents the amount of spinning reserve, above and beyond 10minute spinning reserve, that the Resource could convert to energy within 30 minutes.

However, the sum of the amount of Energy or Demand Reduction each Resource is scheduled to provide, the amount of Regulation Service it is scheduled to provide, and the amount of each Operating Reserves product it is scheduled to provide shall not exceed UOL_N or UOL_E, whichever is applicable.

The NYISO shall select Operating Reserve Suppliers for each hour of the upcoming day through a co-optimized Day-Ahead commitment process that minimizes the total cost of Energy,
Operating Reserves, and Regulation Service, using Bids submitted to the NYISO. As part of the cooptimization process, the NYISO shall determine how much of each Operating Reserves product particular Suppliers will be required to provide in light of the Reliability Rules and other applicable reliability standards, including the locational Operating Reserves requirements specified above.

6.3.2. NYISO Notice Requirement

The NYISO shall notify each Operating Reserve Supplier that has been selected in the Day Ahead Scheduling process of the amount of each Operating Reserve product that it has been scheduled to provide. This notification is provided through the Market Information System consistent with all other Day-Ahead market notifications.

6.3.3. Responsibilities of Suppliers Scheduled to Provide Operating Reserves in the Day-Ahead Market

Suppliers, including Suppliers engaged in Dual Participation, that are scheduled Day-Ahead to provide Operating Reserves shall either provide Operating Reserve, or Energy, or, when the NYISO has the capability to support demand side participation, reduce demand in Real-Time when scheduled by the NYISO in all hours for which they have been selected to provide Operating Reserve and are physically capable of doing so. However, Suppliers that are scheduled Day-Ahead to provide Operating Reserves and have startup periods of two hours or less may advise the NYISO no later than three hours prior to the first hour of their Day-Ahead schedule that they will not be available to provide Operating Reserves or Energy in Real-Time under normal conditions. Such Suppliers will be required to settle their Day-Ahead schedule at Real-Time prices. The only restriction on Suppliers' ability to exercise this option is that all Suppliers with Day-Ahead Operating Reserves schedules must make the scheduled amount of Capacity available to the NYISO for dispatch in the RTD if the NYISO initiates a Supplemental Resource Evaluation.

6.4. General Real-Time Market Rules

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6.4.1. Bid Selection

The NYISO will automatically select Operating Reserves Suppliers in Real-Time from eligible Resources. All Suppliers will automatically be assigned a Real-Time Operating Reserves Availability bid of $0/MW.

Demand Side Resources and BTM:NG Resources can be qualified to bid synchronous or non synchronous reserves, but not both. Demand Side Resources that are qualified to bid synchronous reserves must bid a start up cost of $0 and a minimum generation cost of $0. Demand Side
Resources that are qualified to bid non-synchronous reserves may bid a start up cost but the minimum generation cost must be set to $0. BTM:NG Resources cannot bid any start up cost or minimum generation cost or MWs. Demand Side Resources AND BTM:NG Resources make

themselves eligible to offer reserves in the real time market by submitting a real time energy bid. Real time energy bids created from day-ahead bids, based on accepted day-ahead reserve bids cannot be increased. The real time energy bid will be used by RTD to determine energy schedules in real time.

The NYISO may schedule Suppliers that make themselves available to provide Operating Reserves up to the following maximum Operating Reserve levels:

1. For Spinning Reserves, the Resource's emergency response rate multiplied by ten.
2. For 10-Minute Non-Synchronized Reserves, or for non-synchronized 30-Minute Reserves, the Resource's UOL_N or UOL_E, whichever is applicable at the relevant time (the Resource may offer one product or the other depending on the time required for it to start-up and synchronize to the grid).
3. For synchronized 30-Minute Reserves, the Resource's emergency response rate multiplied by 20. This represents the amount of spinning reserve, above and beyond 10minute spinning reserve, that the Resource could convert to energy within 30 minutes.

However, the sum of the amount of Energy, or Demand Reduction, that each Resource is scheduled to provide, the amount of Regulation Capacity it is scheduled to provide, and the amount of each Operating Reserves product it is scheduled to provide shall not exceed its UOL_N or UOL_E, whichever is applicable.

Suppliers will thus be selected based on their response rates, their applicable upper operating limit, and their Energy Bid (which will reflect their opportunity costs) through a co-optimized Real Time commitment and dispatch process that minimizes the total cost of Energy, Regulation Service, and Operating Reserves. As part of the process, the NYISO shall determine how much of each Operating Reserves product particular Suppliers will be required to provide in light of the Reliability Rules and other applicable reliability standards, including the locational Operating Reserves requirements specified above.

6.4.2. NYISO Notice Requirements

The NYISO shall notify each Supplier of Operating Reserve that has been selected by RTD of the amount of Operating Reserve that it is scheduled to provide. This notification is provided through the Market Information System consistent with all other real-time market notifications.

6.4.3. Obligation to Make Resources Available to Provide Operating Reserves

Any Resource that is eligible to supply Operating Reserves and that is made available to the

NYISO for dispatch in Real-Time, must also make itself available to provide Operating Reserves.

6.4.4. Activation of Operating Reserves

All Resources that are selected by the NYISO to provide Operating Reserves shall respond to the NYISO's directions to activate in Real-Time.

6.4.5. Performance Tracking and Supplier Disqualifications

When a Supplier selected to supply Operating Reserves is activated, the NYISO shall measure and track its actual Energy production or actual demand reduction against its expected performance in Real-Time. The NYISO may disqualify Suppliers that consistently fail to provide Energy when scheduled from providing Operating Reserves in the future. If a Resource has been disqualified, the NYISO shall require it to pass a re-qualification test before accepting any additional Bids to supply Operating Reserves, as described in sections 6.1 and 6.12 of this manual.

6.5. Operating Reserve Settlements – General Rules

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6.5.1. Establishing Locational Reserve Prices

Except as noted below in sections 6.5.2 and 6.5.3, the NYISO shall calculate separate Day-Ahead Market and Real-Time Market prices for each of the three Operating Reserve products for each of the Load Zones based on the following ~~four~~ five locations:

1. West of Central-East (West or Western)
2. East of Central-East Excluding Southeastern New York (East or Eastern)
3. ~~3.~~ Southeastern New York Excluding Long Island (Southeastern)
3.
4. New York City (N.Y.C.)
5. ~~4.~~ Long Island (L.I.).

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The NYISO will thus calculate ~~twelve~~ fifteen different locational Operating Reserve prices in both the Day-Ahead Market and the Real-Time Market.

6.5.2. Settlements Involving Suppliers of Operating Reserves Located on Long Island

Suppliers of Operating Reserves located on Long Island shall receive settlement payments as if they were providing Operating Reserves located in Southeastern New York. The NYISO will calculate separate locational Long Island Operating Reserves prices but will not post

them or use them for settlement purposes. If an activation of the EDRP and/or SCR program, as described in
Section 6.5.3, includes Long Island in addition to at least one other Load Zone, Suppliers of Operating Reserves located on Long Island shall receive payments as if they were providing Operating Reserves located in Southeastern New York and were part of the applicable Scarcity Reserve Region.

6.5.3. Establishing Reserve Clearing Prices during EDRP/SCR Activation Intervals

Additional 30-minute reserves are procured in Scarcity Reserve Region(s), as identified by the NYISO, in real-time during periods when EDRP resources and/or SCRs have been called upon by the NYISO to provide load reduction. In such an instance, the NYISO shall calculate separate Real Time Market prices for each of the three Operating Reserve products for each of the Load Zones based on the ~~four~~ five locations outlined in Section 6.5.1, as well as for any applicable Scarcity Reserve Region(s).

6.5.4. "Cascading" of Operating Reserves

The NYISO will deem Spinning Reserve to be the "highest quality" Operating Reserve, followed by 10-Minute Non-Synchronized Reserve and by 30-Minute Reserve (spinning and then nonsynchronized). The NYISO shall substitute higher quality Operating Reserves in place of lower quality Operating Reserves, when doing so lowers the total as-bid cost, i.e., when the marginal cost for the higher quality Operating Reserve product is lower than the marginal cost for the lower quality Operating Reserve product, and the substitution of a higher quality for the lower quality product does not cause locational Operating Reserve requirements to be violated. However, to the extent that reliability standards require the use of higher quality Operating Reserves, substitution cannot be made in the opposite direction.

The price of higher quality Operating Reserves will not be set at a price below the price of lower quality Operating Reserves in the same location. Thus, for a given location, the price of Spinning Reserves will not be below the price for 10-Minute Non-Synchronized Reserves or 30-Minute Reserves and the clearing price for 10-Minute Non-Synchronized Reserves will not be below the clearing price for 30-Minute Reserves.

6.6. Operating Reserve Settlements – Day-Ahead Market

Please refer to Rate Schedule 5 of the NYISO OATT, Rate Schedule 4 of the NYISO ~~Market~~ Services Tariff, and the Accounting and Billing Manual for information about Operating Reserve Settlements for the Day Ahead Market.

6.7. Operating Reserve Settlements – Real-Time Market

Please refer to Rate Schedule 5 of the NYISO OATT, Rate Schedule 4 of the NYISO ~~Market~~ Services Tariff, and the Accounting and Billing Manual for Information about Operating Reserve Settlements for the Real-Time Market.

6.8. Operating Reserve Demand Curves

The NYISO shall establish ~~twelve~~ fifteen Operating Reserve Demand Curves, one for each Operating Reserves requirement, except as noted in section 6.8.1 below. Specifically, there shall be a demand curve for:

1. Total Spinning Reserves
2. Eastern, Southeastern, New York City, or Long Island Spinning Reserves
3. Southeastern, New York City, or Long Island Spinning Reserves
4. New York City Spinning Reserves

~~4.~~5. Long Island Spinning Reserves

~~5.~~6. Total 10-Minute Non-Synchronized Reserves

~~6.~~7. Eastern, Southeastern, New York City, or Long Island 10-Minute Non-Synchronized Reserves

8. Southeastern, New York City or Long Island 10-Minute Non-Synchronized Reserves

~~7.~~9. New York City 10-Minute Non-Synchronized Reserves

~~8.~~10. Long Island 10-Minute Non-Synchronized Reserves

~~9.~~11. Total 30-Minute Reserves

12. Eastern, Southeastern or Long Island 30-Minute Reserves ~~11.~~

13. Southeastern or Long Island 30-Minute Reserves

14. New York City 30-Minute Reserves

15. ~~12.~~ Long Island 30-Minute Reserves.

Each Operating Reserve Demand Curve will apply to both the Day-Ahead Market and the RealTime Market for the relevant product and location, except for those reserve demand curves that apply to certain Scarcity Reserve Requirements which will be applicable only

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during the real-time intervals that a Scarcity Reserve Requirement has been established by the NYISO.~~.~~

The NYISO Procedures shall establish a target level for each Operating Reserves requirement for each hour, which will be the number of MW of Operating Reserves meeting that requirement that the NYISO would seek to maintain in that hour if cost were not a consideration. The NYISO will then define an Operating Reserves demand curve for that hour corresponding to each Operating Reserves requirement as follows:

1. ***Total Spinning Reserves*** – For quantities of Operating Reserves meeting the total Spinning Reserves requirement that are less than or equal to the target level for that requirement, the price on the total Spinning Reserves demand curve shall be $775/MW. For all other quantities, the price on the total Spinning Reserves demand curve shall be $0/MW.
2. ***Eastern, Southeastern, New York City, or Long Island Spinning Reserves*** – For quantities of Operating Reserves meeting the Eastern, Southeastern, New York City, or Long Island Spinning Reserves requirement that are less than or equal to the target level for that requirement, the price on the Eastern, Southeastern, New York City, or Long Island Spinning Reserves demand curve shall be $25/MW. For all other quantities, the price on the Eastern, Southeastern, New York City, or Long Island Spinning Reserves demand curve shall be $0/MW.
3. ***Southeastern, New York City, or Long Island Spinning Reserves*** - For quantities of Operating Reserves meeting the Southeastern, New York City, or Long Island Spinning Reserves requirement that are less than or equal to the target level for that requirement, the price on the Southeastern, New York City, or Long Island Spinning Reserves demand curve shall be $25/MW. For all other quantities, the price on the Southeastern, New York City, or Long Island Spinning Reserves demand curve shall be $0/MW.
4. ***New York City Spinning Reserves*** - For quantities of Operating Reserves meeting the New York City Spinning Reserves requirement that are less than or equal to the target level for that locational requirement, the price on the New York City Spinning Reserves demand curve shall be $25/MW. For all other quantities, the price on the New York City Spinning Reserves demand curve shall be $0/MW.
4.5. ***Long Island Spinning Reserves*** – For quantities of Operating Reserves meeting the Long Island Spinning Reserves requirement that are less than or equal to the target level for that requirement, the price on the Long Island Spinning Reserves demand curve shall be $25/MW. For all other quantities, the price on the Long Island Spinning Reserves demand curve shall be $0/MW.
5.6. ***Total 10-Minute Reserves*** – For quantities of Operating Reserves meeting the total 10minute reserves requirement that are less than or equal to the target level for that requirement, the price on the total 10-minute reserves demand curve shall be $750/MW. For all other quantities, the price on the total 10-minute reserves demand curve shall be $0/MW.

~~6.~~7. ***Eastern, Southeastern, New York City, or Long Island 10-Minute Reserves*** – For quantities of Operating Reserves meeting the Eastern, Southeastern, New York City, or Long Island 10-minute reserves requirement that are less than or equal to the target level for that requirement, the price on the Eastern, Southeastern, New York City, or Long Island 10-minute reserves demand curve shall be $775/MW. For all other quantities, the price on the Eastern, Southeastern, New York City, or Long Island 10-Minute Reserves demand curve shall be $0/MW.

8. ***Southeastern, New York City, or Long Island 10-Minute Reserves*** - For quantities of Operating Reserves meeting the Southeastern, New York City, or Long Island 10-minute reserves requirement that are less than or equal to the target level for that requirement, the price on the Southeastern, New York City, or Long Island 10-minute reserves demand curve shall be $25/MW. For all other quantities, the price on the Southeastern, New York City, or Long Island 10-Minute Reserves demand curve shall be $0/MW.

~~7.~~9. ***New York City 10-Minute Reserves*** - For quantities of Operating Reserves meeting the New York City 10-minute reserves requirement that are less than or equal to the target level for that locational requirement, the price on the New York City 10-minute reserves demand curve shall be $25/MW. For all other quantities, the price on the New York City 10-minute reserves demand curve shall be $0/MW.

~~8.~~10. ***Long Island 10-Minute Reserves*** – For quantities of Operating Reserves meeting the Long Island 10-minute reserves requirement that are less than or equal to the target level for that requirement, the price on the Long Island 10-minute reserves demand curve shall be $25/MW. For all other quantities, the price on the Long Island 10-minute reserves demand curve shall be $0/MW.

~~9.~~11. ***Total 30-Minute Reserves*** – For quantities of Operating Reserves meeting the total 30Minute Reserves requirement that are less than or equal to the target level for that requirement minus 955 MW, the price on the total 30-Minute Reserves demand curve shall be $750/MW. For quantities of Operating Reserves meeting the total 30-Minute Reserves requirement that are less than or equal to the target level for that requirement minus 655 MW but that exceed the target level for that requirement minus 955 MW, the price on the total 30-Minute Reserves demand curve shall be $200/MW. For quantities of Operating Reserves meeting the total 30-Minute Reserves requirement that are less than or equal to the target level for that requirement minus 300 MW, but that exceed the target level for that requirement minus 655 MW, the price on the total 30-Minute Reserves demand curve shall be $100/MW. For quantities of Operating Reserves meeting the total 30-Minute Reserves requirement that are less than or equal to the target level for that requirement but that exceed the target level for that requirement minus 300 MW, the price on the total 30-Minute Reserves demand curve shall be $25/MW. For all other quantities, the price on the total 30-Minute Reserves demand curve shall be $0/MW. The NYISO, however, will not schedule more total 30-minute Reserves than the target level defined for the requirement for that hour.

~~10.~~12. ***Eastern, Southeastern, New York City, or Long Island 30-Minute Reserves*** – For quantities of Operating Reserves meeting the Eastern, Southeastern, New York City, or Long Island 30-Minute Reserves requirement that are less than or equal to the target level for that requirement, the price on the Eastern, Southeastern, New York City, or Long Island 30-Minute Reserves demand curve shall be $25/MW. For

all other quantities, the price on the Eastern, Southeastern, New York City, or Long Island 30-Minute Reserves demand curve shall be $0/MW.

13. ***Southeastern, New York City, or Long Island 30-Minute Reserves*** - For quantities of Operating Reserves meeting the Southeastern, New York City, or Long Island 30-Minute Reserves requirement that are less than or equal to the target level for that requirement, the price on the Southeastern, New York City, or Long Island 30-Minute Reserves demand curve shall be $500/MW. For all other quantities, the price on the Southeastern, New York City, or Long Island 30-Minute Reserves demand curve shall be $0/MW.

~~11.~~14. ***New York City 30-Minute Reserves*** - For quantities of Operating Reserves meeting the New York City 30-Minute Reserves requirement that are less than or equal to the target level for that locational requirement, the price on the New York City 30-Minute Reserves demand curve shall be $25/MW. For all other quantities, the price on the New York City 30-Minute Reserves demand curve shall be $0/MW.

~~12.~~15. ***Long Island 30-Minute Reserves*** – For quantities of Operating Reserves meeting the Long Island 30-Minute Reserves requirement that are less than or equal to the target level for that requirement, the price on the Long Island 30-Minute Reserves demand curve shall be $25/MW. For all other quantities, the price on the Long Island 30-Minute Reserves demand curve shall be $0/MW.

In order to respond to operational or reliability problems that arise in Real-Time, the NYISO may procure any Operating Reserve product at a quantity and/or price point different than those specified above. The NYISO shall post a notice of any such purchase as soon as reasonably possible and shall report on the reasons for such purchases at the next meeting of its Business Issues Committee. The NYISO shall also investigate whether it is necessary to modify the quantity and price points specified above to avoid future operational or reliability problems. The NYISO will consult with its Market Monitoring Unit when it conducts this investigation.

If the NYISO determines that it is necessary to modify the quantity and/or price points specified above in order to avoid future operational or reliability problems it may temporarily modify them for a period of up to ninety days. If circumstances reasonably allow, the NYISO will consult with its Market Monitoring Unit, the Business Issues Committee, FERC, and the PSC before implementing any such modification. In all circumstances, the NYISO will consult with those entities as soon as reasonably possible after implementing a temporary modification.

The NYISO and its Market Monitoring Unit shall conduct periodic reviews as to whether the Operating Reserve Demand Curves should be adjusted to optimize the economic efficiency of the NYISO Markets.

6.8.1. 30-Minute Operating Reserve Demand Curves during EDRP/SCR Activation Intervals

As is further described in Sections 15.4.6.2 and 15.4.7 of Rate Schedule 4 of the NYISO Services Tariff, the NYISO shall establish new 30-minute reserve demand curves or modify existing 30minute demand curves during real-time periods when EDRP resources and/or SCRs have been called upon by the NYISO to provide load reduction. The NYISO may activate these resources throughout the NYCA, within a single Load Zone, or within a group of Load Zones; the area in which those resources are activated is called the Scarcity Reserve Region. (In the event of simultaneous activations of these resources in different areas to address different needs, there may be multiple Scarcity Reserve Regions.) The NYISO will determine a Scarcity Reserve Requirement in each interval for each Scarcity Reserve Region, which is generally equal to the amount of Load reduction that the NYISO anticipates that EDRP resources and SCRs in that Scarcity Reserve Region will provide, minus the amount of unscheduled energy production capability that could be provided by available Suppliers located in that Scarcity Reserve Region in greater than 30-minutes, but less than or equal to 60 minutes.

The impact of the EDRP/SCR program activations on the 30-minute reserve demand curve of the existing locational reserve region(s) or the newly created Scarcity Reserve Region(s) are outlined below, together with illustrative examples for each scenario.

For purposes of the examples below, the following variables are used to represent the 30minute Operating Reserve requirements that are applicable at times when EDRP resources and SCRs have not been activated to provide load reduction. See section 6.2.1 for additional information regarding locational reserve requirements established by the NYISO:

Variable	30-Minute Locational Reserve Requirement
NYCA~~W~~	NYCA
East~~X~~	East of Central-East
SENY~~Y~~	Southeastern New York (SENY)
NYC	New York City
LI~~Z~~	Long Island

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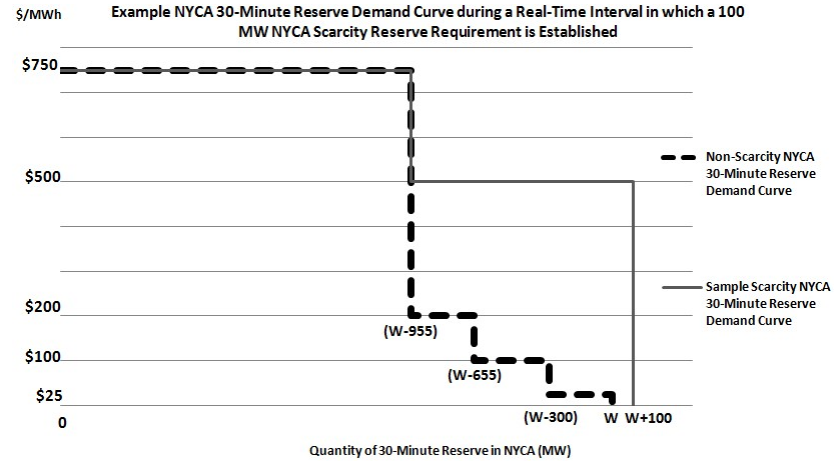
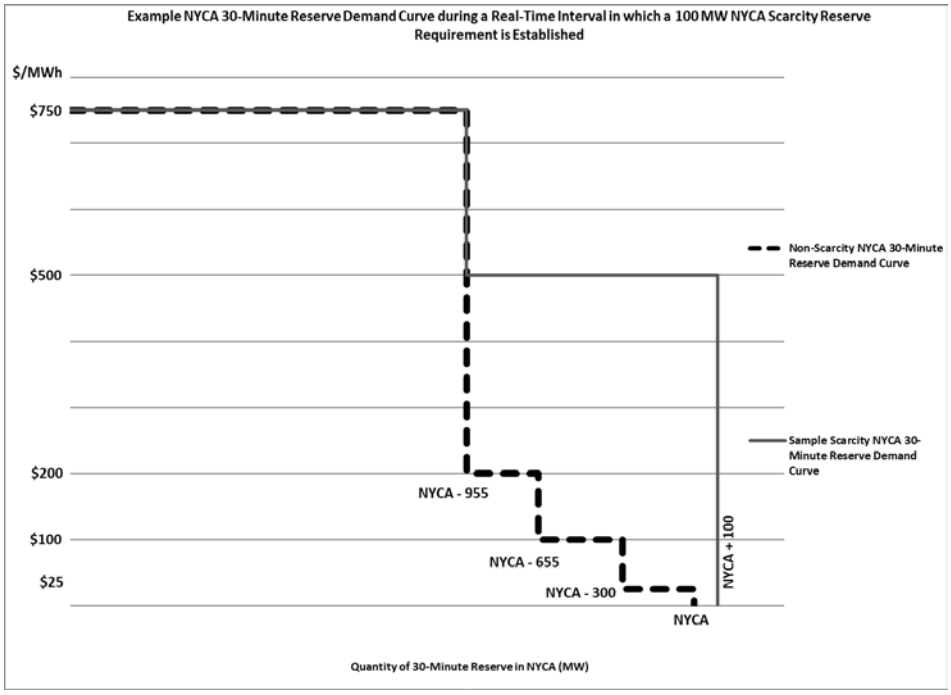
1. If NYCA (all Load Zones) is identified as a Scarcity Reserve Region, then the NYCA 30minute reserve requirement will be increased by the Scarcity Reserve Requirement. If the quantity of 30-minute reserve provided in the NYCA exceeds the revised NYCA 30-

minute reserve requirement minus an amount equal to the sum of 955 MW and the Scarcity Reserve Requirement, but is less than or equal to the revised NYCA 30-minute reserve requirement, the corresponding price on the NYCA 30-minute reserve demand curve will be $500/MW. If the quantity of 30-minute reserve provided in the NYCA is less than or

equal to the revised NYCA 30-minute reserve requirement minus an amount equal to the sum of 955 MW and the Scarcity Reserve Requirement, the corresponding price on the NYCA 30-minute reserve demand curve will be $750/MW.

For example, consider that NYCA is the only Scarcity Reserve Region identified, and the additional NYCA Scarcity Reserve Requirement for NYCA is calculated as 100 MW for an interval. The applicable impacts on the NYCA 30-minute reserve demand curve during that real-time interval would be as follows:





In the above example, no other 30-minute reserve demand curves are modified.

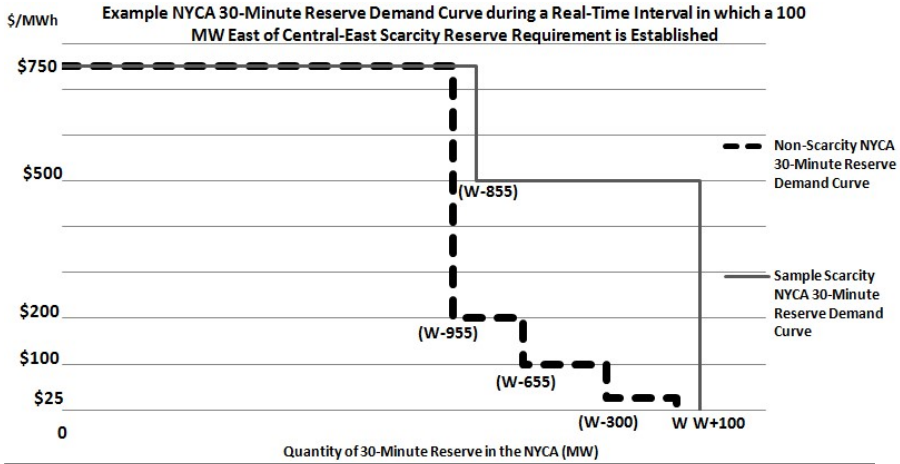
2. If East of Central-East (Load Zones F, G, H, I, J, and K) is identified as a Scarcity Reserve Region, then the East of Central-East 30-minute reserve requirement will be increased by the Scarcity Reserve Requirement. If the quantity of 30-minute reserve provided in East of Central-East exceeds the Scarcity Reserve Requirement, the corresponding price on the

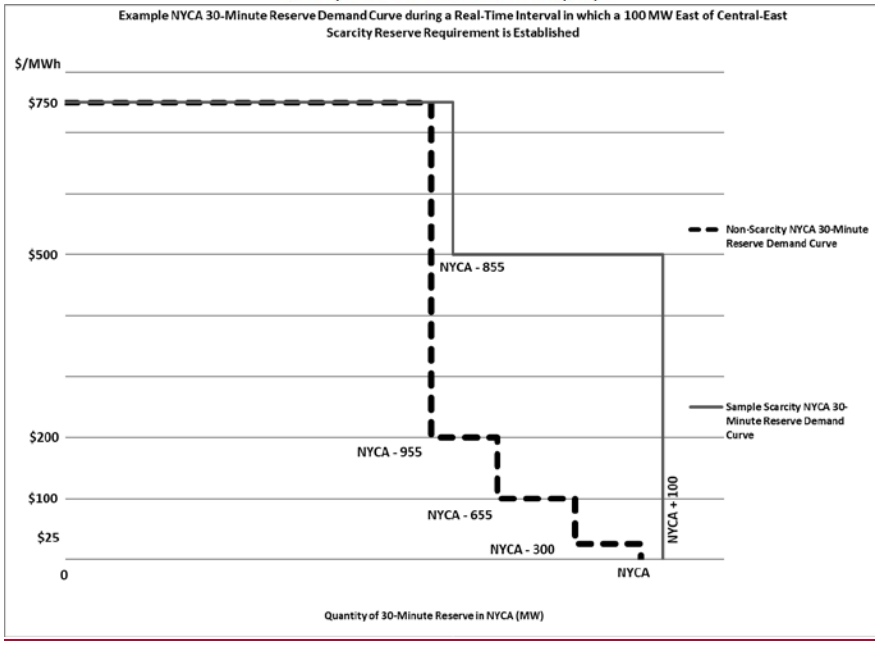
   East of Central-East 30-minute reserve demand curve will be $25/MW. If the quantity of

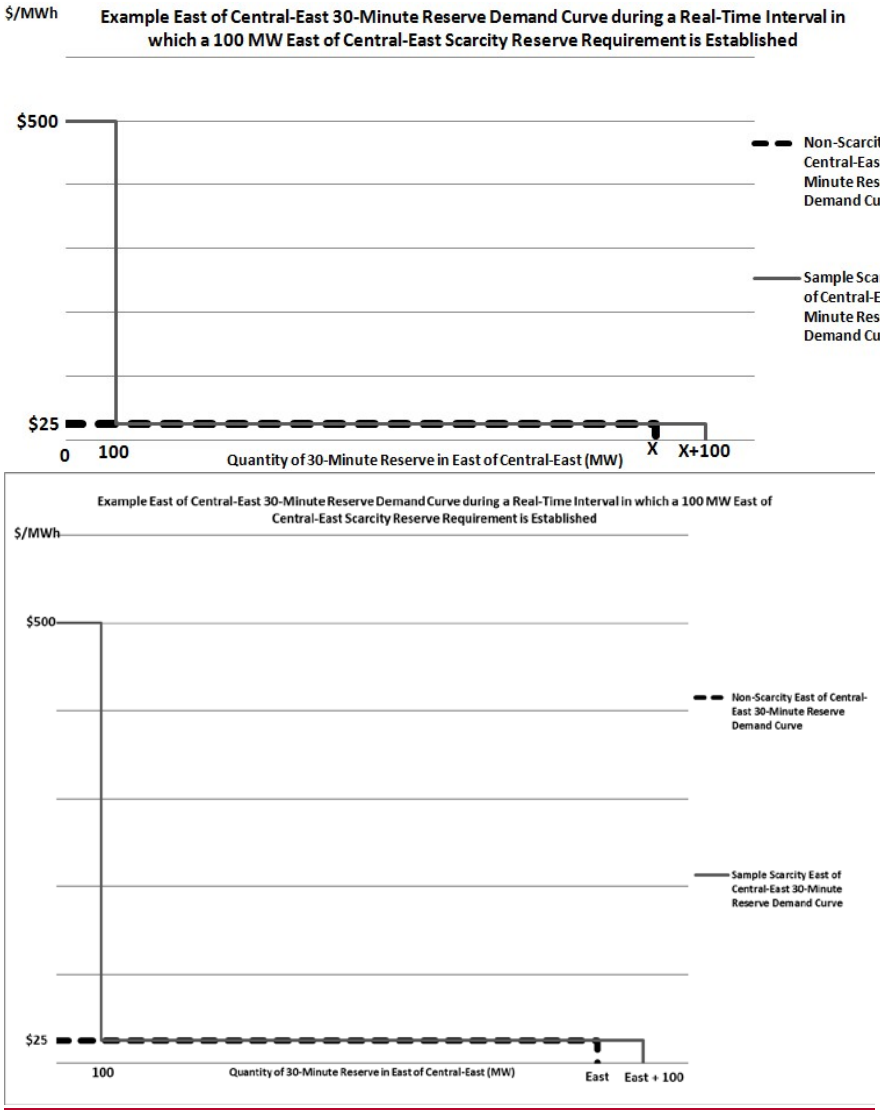
   30-minute reserve provided in East of Central-East is less than or equal to the Scarcity Reserve Requirement, the corresponding price on the East of Central-East 30-minute reserve demand curve will be $500/MW. Additionally:

   a. The NYCA 30-minute reserve requirement will be increased by the Scarcity Reserve Requirement. If the quantity of 30-minute reserve provided in the NYCA exceeds the revised NYCA 30-minute reserve requirement minus 955 MW, but is less than or equal to the revised NYCA 30-minute reserve requirement, the corresponding price on the NYCA 30-minute reserve demand curve will be $500/MW. If the quantity of 30-minute reserve provided in the NYCA is less than or equal to the revised NYCA 30-minute reserve requirement minus 955 MW, the corresponding price on the NYCA 30-minute demand curve will be $750/MW.

For example, consider that East of Central-East is the only Scarcity Reserve Region identified, and that the additional Scarcity Reserve Requirement for East of Central-East is calculated as 100 MW for an interval. The applicable impacts to the affected 30-minute reserve demand curves during such real-time interval would be as follows:


Example NYCA 30-Minute Reserve Demand Curve during a Real-Time Interval in which a 100 MW East of Central-East Scarcity Reserve Requirement is Established
$/MWh
$750
$500
$200
$100
$25
0
(W-855)
(W-955)
(W-655)
(W-300)
W
W+100
Non-Scarcity NYCA 30-Minute Reserve Demand Curve
Sample Scarcity NYCA 30-Minute Reserve Demand Curve
Quantity of 30-Minute Reserve in the NYCA (MW)


Example NYCA 30-Minute Reserve Demand Curve during a Real-Time Interval in which a 100 MW East of Central-East Scarcity Reserve Requirement is Established
$/MWh
$750
$500
$200
$100
$25
0
NYCA - 855
NYCA - 955
NYCA - 655
NYCA - 300
NYCA
NYCA +100
Non-Scarcity NYCA 30-Minute Reserve Demand Curve
Sample Scarcity NYCA 30-Minute Reserve Demand Curve
Quantity of 30-Minute Reserve in NYCA (MW)



In the above example, no other 30-minute reserve demand curves are modified.

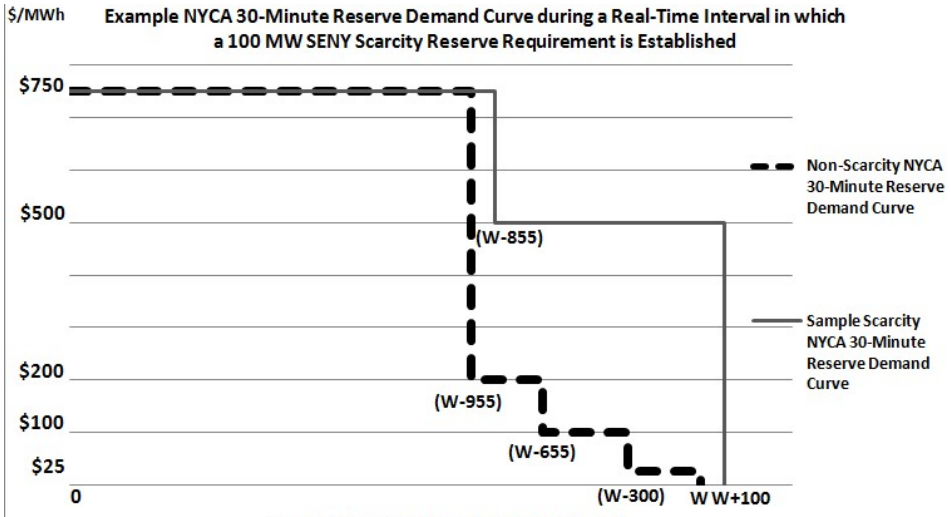
3. If Southeastern New York (Load Zones G, H, I, J, and K) is identified as a Scarcity Reserve Region, then the Southeastern New York 30-minute reserve requirement will be

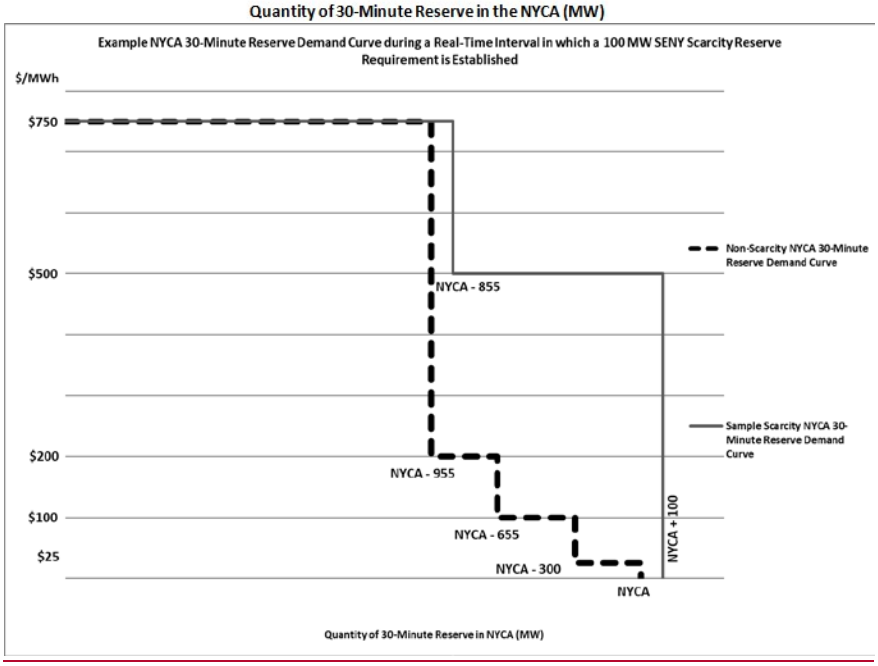
increased by the Scarcity Reserve Requirement. If the quantity of 30-minute reserve provided in Southeastern New York is less than or equal to the revised Southeastern New York 30-minute reserve requirement, the corresponding price on the Southeastern New York 30-minute reserve demand curve will be $500/MW. Additionally:

a. The NYCA 30-minute reserve requirement will be increased by the Scarcity Reserve Requirement. If the quantity of 30-minute reserve provided in the NYCA exceeds the revised NYCA 30-minute reserve requirement minus 955 MW, but is less than or equal to the revised NYCA 30-minute reserve requirement, the corresponding price on the NYCA 30-minute reserve demand curve will be $500/MW. If the quantity of 30-minute reserve provided in the NYCA is less than or equal to the revised NYCA 30-minute reserve requirement minus 955 MW, the corresponding price on the NYCA 30-minute demand curve will be $750/MW.

b. The East of Central-East 30-minute reserve requirement will be increased by the
Scarcity Reserve Requirement. If the quantity of 30-minute reserve provided in East of Central-East is less than or equal to the revised East of Central-East 30minute reserve requirement, the corresponding price on the East of Central-East 30-minute reserve demand curve will be $25/MW.

For example, consider that Southeastern New York is the only Scarcity Reserve Region identified, and that the additional Scarcity Reserve Requirement for Southeastern New York is calculated as 100 MW for an interval. The applicable impacts to the affected 30-minute reserve demand curves during such real-time interval would be as follows:





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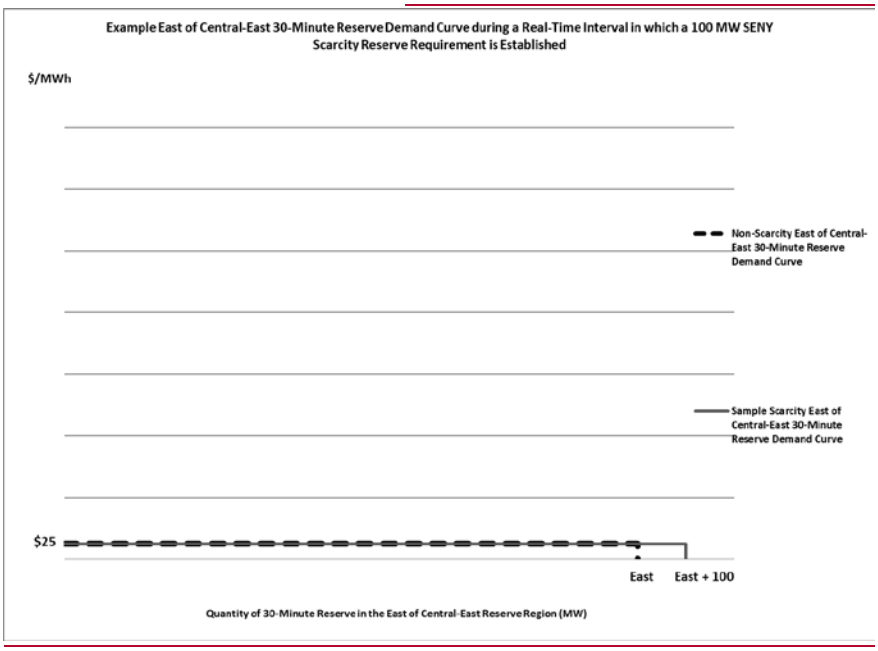
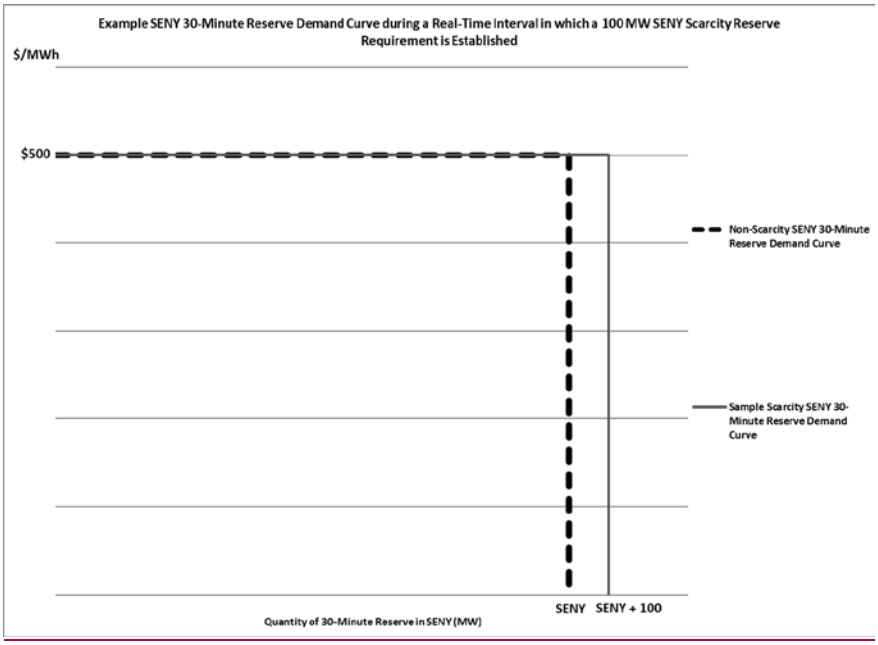

Example East of Central-East 30-Minute Reserve Demand Curve during a Real-Time Interval in which a 100 MW SENY Scarcity Reserve Requirement is Established
$/MWh
Non-Scarcity East of Central-East 30-Minute Reserve Demand Curve
Sample Scarcity East of Central-East 30-Minute Reserve Demand Curve
$25
East
East + 100
Quantity of 30-Minute Reserve in the East of Central-East Reserve Region (MW)



In the above example, no other 30-minute reserve demand curves are modified.

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4. If N.Y.C. (Load Zone J) is identified as a Scarcity Reserve Region, then the N.Y.C. 30-minute reserve requirement will be increased by the Scarcity Reserve Requirement. If the quantity of 30-minute reserve provided in N.Y.C. exceeds the Scarcity Reserve Requirement, the corresponding price in the N.Y.C. 30-minute reserve demand curve will be $25/MW. If the quantity of 30-minute reserve provided on N.Y.C. is less than or equal to the Scarcity Reserve Requirement, the corresponding price on the N.Y.C. 30-minute reserve demand curve will be $500/MW. Additionally:

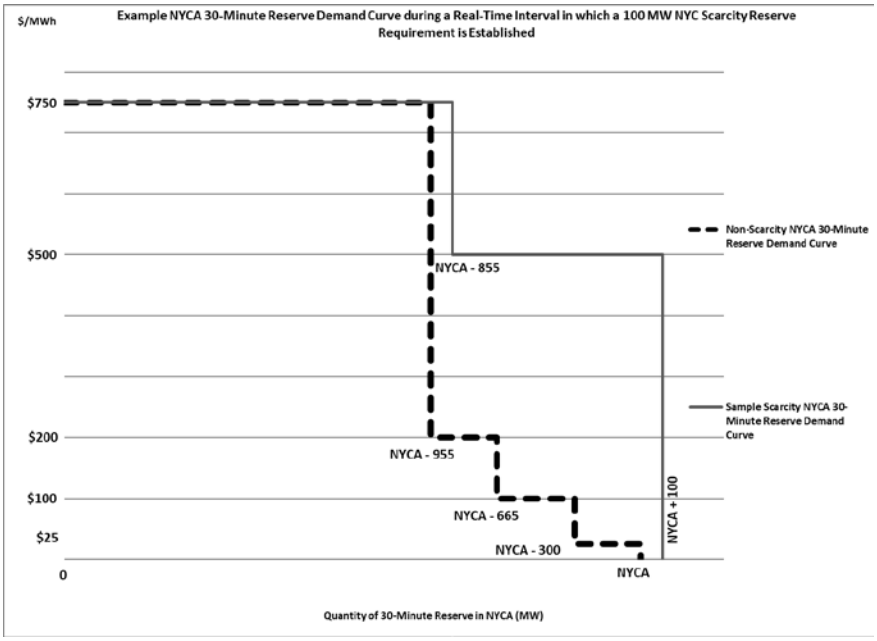
    a. The NYCA 30-minute reserve requirement will be increased by the Scarcity Reserve Requirement. If the quantity of 30-minute reserve that is provided in the NYCA exceeds the revised NYCA 30-minute reserve requirement minus 955 MW, but is less than or equal to the revised NYCA 30-minute reserve requirement, the corresponding price on the NYCA 30-minute reserve demand curve will be $500/MW. If the quantity of 30-minute reserve provided in the NYCA is less than or equal to the revised NYCA 30-

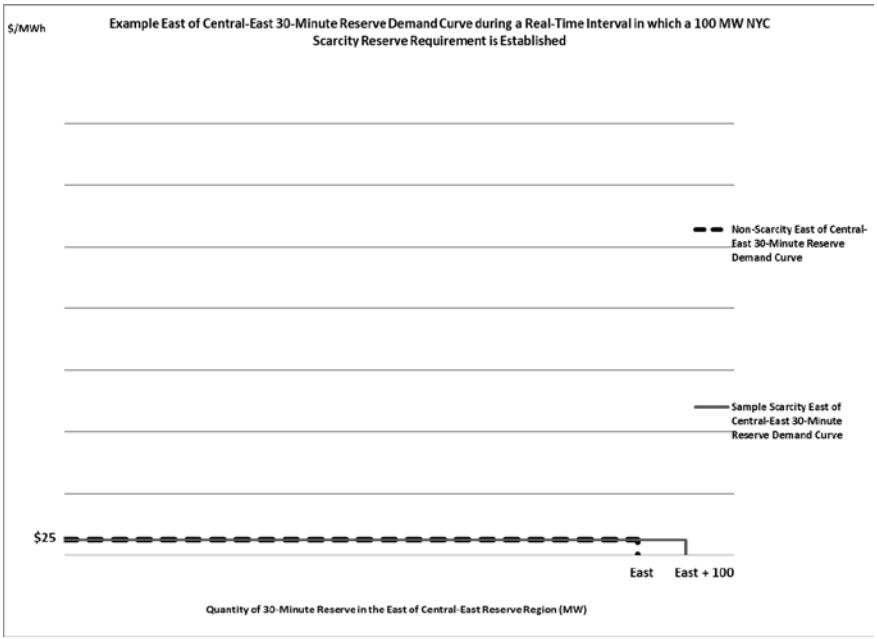
minute reserve requirement minus 955 MW, the corresponding price on the NYCA 30-minute demand curve will be $750/MW.

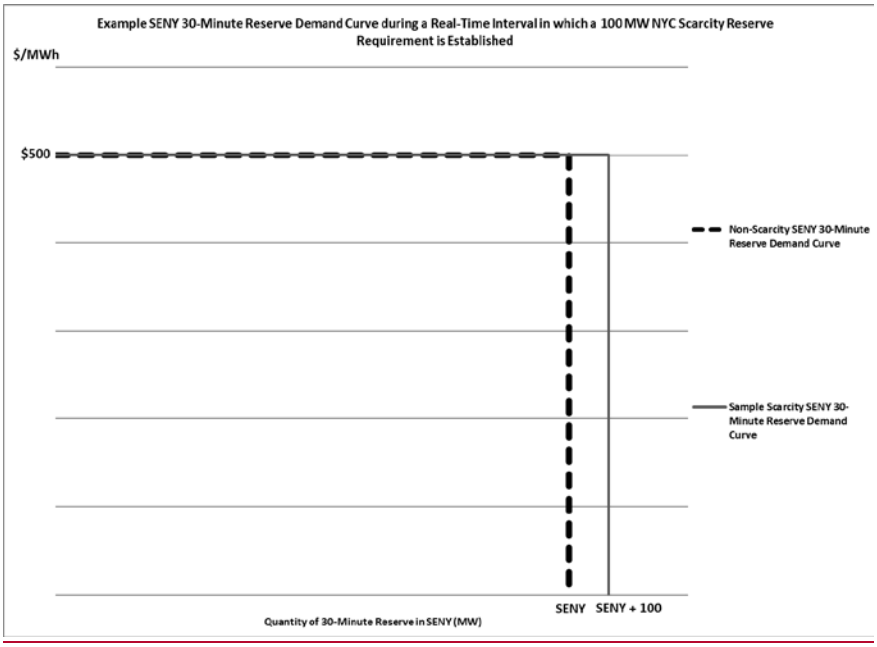
b. The East of Central-East 30-minute reserve requirement will be increased by the Scarcity Reserve Requirement. If the quantity of 30-minute reserve provided in East of Central-East is less than or equal to the revised East of Central-East 30-minute reserve requirement, the corresponding price on the East of Central-East 30-minute reserve demand curve will be $25/MW.

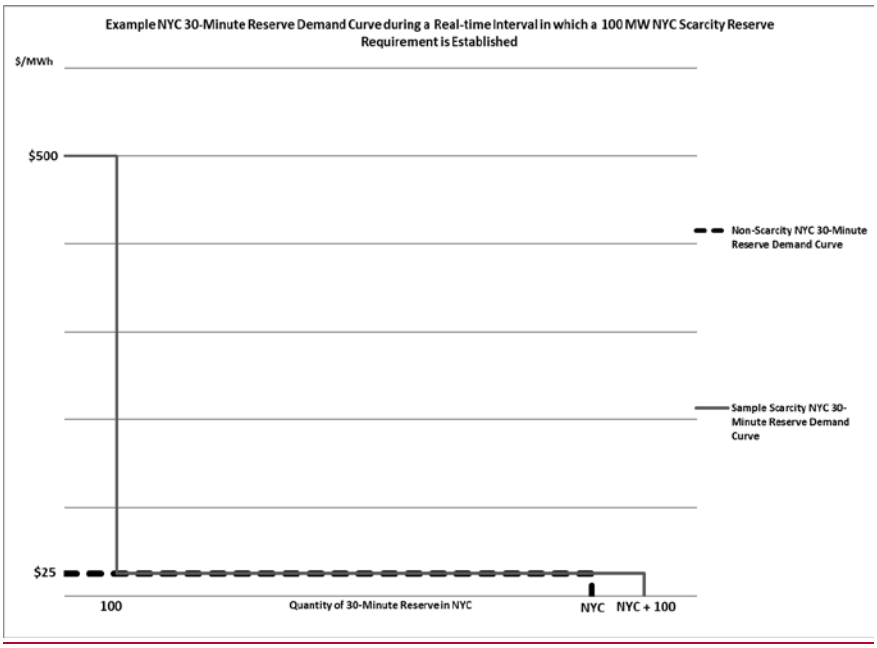
c. The Southeastern New York 30-minute reserve requirement will be increased by the Scarcity Reserve Requirement. If the quantity of 30-minute reserve provided in Southeastern New York is less than or equal to the revised Southeastern New York 30-minute reserve requirement, the corresponding price on the Southeastern New York 30-minute reserve demand curve will be $500/MW.

For example, consider that N.Y.C. is the only Scarcity Reserve Region identified, and that the additional Scarcity Reserve Requirement for N.Y.C. is calculated as 100 MW for an interval. The applicable impacts to the affected 30-minute reserve demand curves during such real-time interval would be as follows (note that, in this example, because the Load Zone that comprises the Scarcity Reserve Region does not belong to Long Island, no adjustments would be made to the otherwise applicable 30-minute reserve demand curve for the Long Island region):


$/MWh
Example NYCA 30-Minute Reserve Demand Curve during a Real-Time Interval in which a 100 MW NYC Scarcity Reserve Requirement is Established
$750
$500
$200
$100
$25
0
NYCA - 855
NYCA - 955
NYCA - 665
NYCA - 300
NYCA
NYCA + 100
Non-Scarcity NYCA 30-Minute Reserve Demand Curve
Sample Scarcity NYCA 30-Minute Reserve Demand Curve
Quantity of 30-Minute Reserve in NYCA (MW)


$/MWh
Example East of Central-East 30-Minute Reserve Demand Curve during a Real-Time Interval in which a 100 MW NYC Scarcity Reserve Requirement is Established
$25
East
East + 100
Non-Scarcity East of Central-East 30-Minute Reserve Demand Curve
Sample Scarcity East of Central-East 30-Minute Reserve Demand Curve
Quantity of 30-Minute Reserve in the East of Central-East Reserve Region (MW)


Example SENY 30-Minute Reserve Demand Curve during a Real-Time Interval in which a 100 MW NYC Scarcity Reserve Requirement is Established
$/MWh
$500
Non-Scarcity SENY 30-Minute Reserve Demand Curve
Sample Scarcity SENY 30-Minute Reserve Demand Curve
SENY
SENY + 100
Quantity of 30-Minute Reserve in SENY (MW)


Example NYC 30-Minute Reserve Demand Curve during a Real-time Interval in which a 100 MW NYC Scarcity Reserve Requirement is Established
$/MWh
$500
Non-Scarcity NYC 30-Minute Reserve Demand Curve
Sample Scarcity NYC 30-Minute Reserve Demand Curve
$25
100
Quantity of 30-Minute Reserve in NYC
NYC
NYC + 100

In the above example, no other 30-minute reserve demand curves are modified.

4.5. If LI (Load Zone K) is identified as a Scarcity Reserve Region, then the LI 30-minute reserve requirement will be increased by the Scarcity Reserve Requirement. If the quantity of 30minute reserve provided on LI exceeds the Scarcity Reserve Requirement, the corresponding price on the LI 30-minute reserve demand curve will be $25/MW. If the quantity of 30-minute reserve provided on LI is less than or equal to the Scarcity Reserve Requirement, the corresponding price on the LI 30-minute reserve demand curve will be $500/MW. Additionally:

a. The NYCA 30-minute reserve requirement will be increased by the Scarcity Reserve Requirement. If the quantity of 30-minute reserve that is provided in the NYCA exceeds the revised NYCA 30-minute reserve requirement minus 955 MW, but is less than or equal to the revised NYCA 30-minute reserve requirement, the corresponding price on the NYCA 30-minute reserve demand curve will be $500/MW. If the quantity of 30-minute reserve provided in the NYCA is less than or equal to the revised NYCA 30-minute reserve requirement minus 955 MW, the corresponding price on the NYCA 30-minute demand curve will be $750/MW.

~~b.~~ The East of Central-East 30-minute reserve requirement will be increased by the

b. Scarcity Reserve Requirement. If the quantity of 30-minute reserve provided in East of Central-East is less than or equal to the revised East of Central-East 30minute reserve requirement, the corresponding price on the East of Central-East 30-minute reserve demand curve will be $25/MW.

c. The Southeastern New York 30-minute reserve requirement will be increased by the Scarcity Reserve Requirement. If the quantity of 30-minute reserve provided in Southeastern New York is less than or equal to the revised Southeastern New York 30-minute reserve requirement, the corresponding price on the Southeastern New York 30-minute reserve demand curve will be $500/MW.

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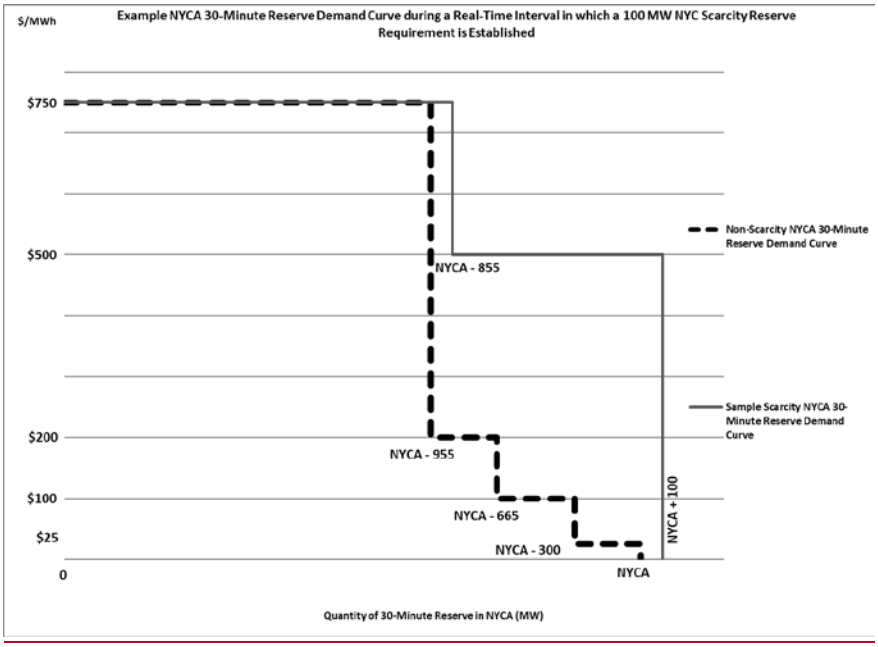
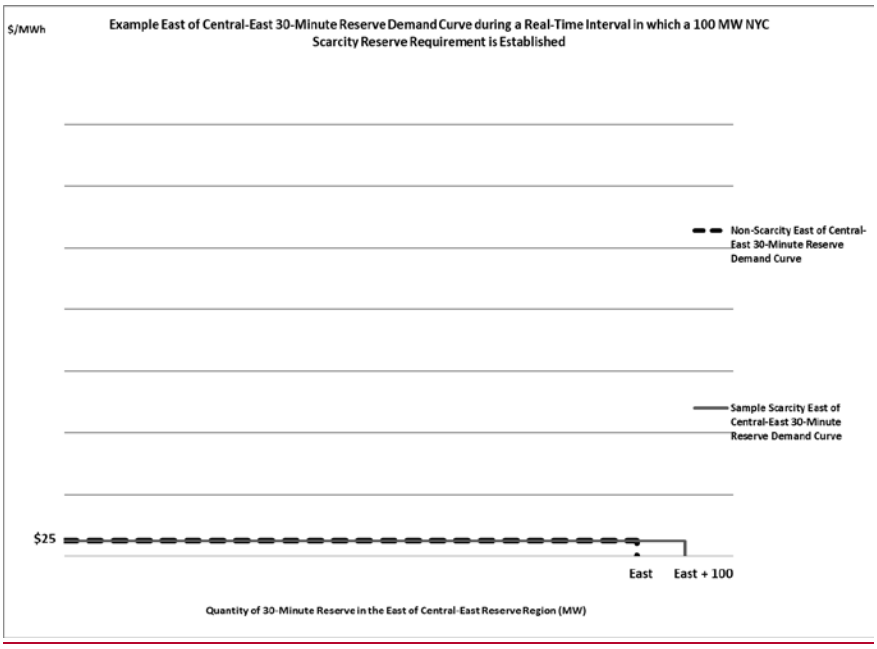
For example, consider that LI is the only Scarcity Reserve Region identified, and that the additional Scarcity Reserve Requirement for LI is calculated as 100 MW for an interval. The applicable impacts to the affected 30-minute reserve demand curves during such real-time interval would be as follows (note that, in this example, because the Load Zone that

comprises the Scarcity Reserve Region does not belong to New York City, no adjustments would be made to the otherwise applicable 30-minute reserve demand curve for the New York City region):





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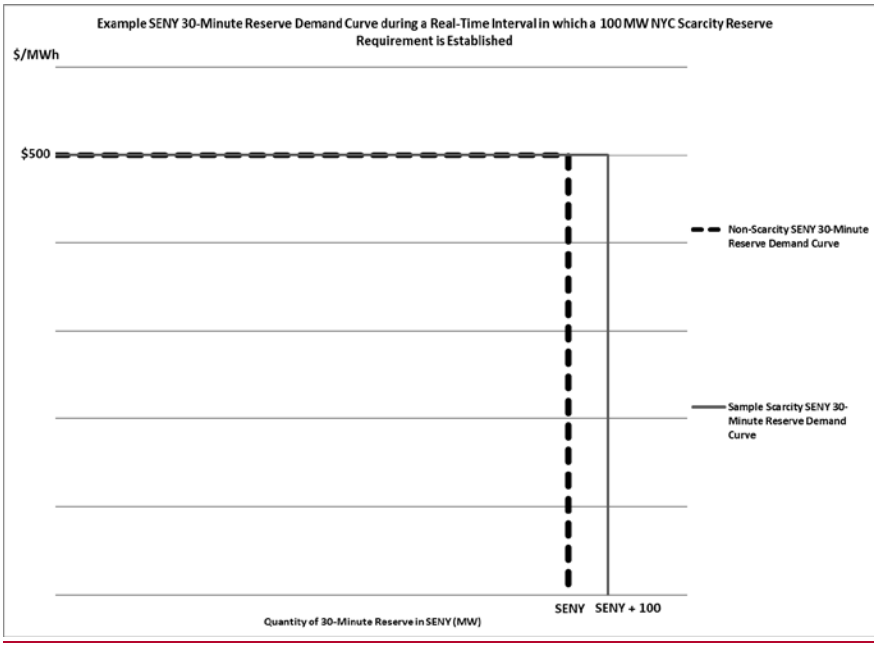
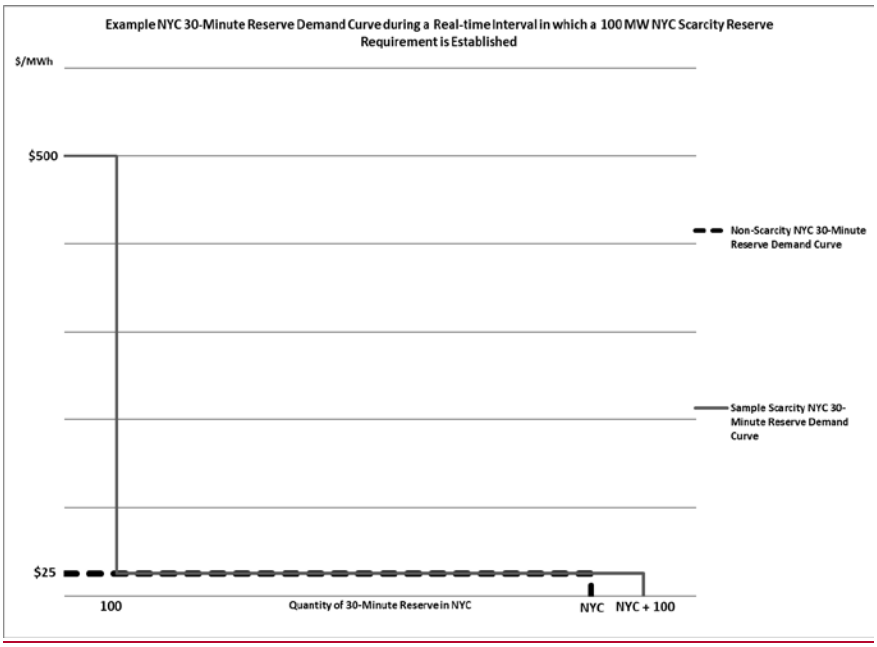
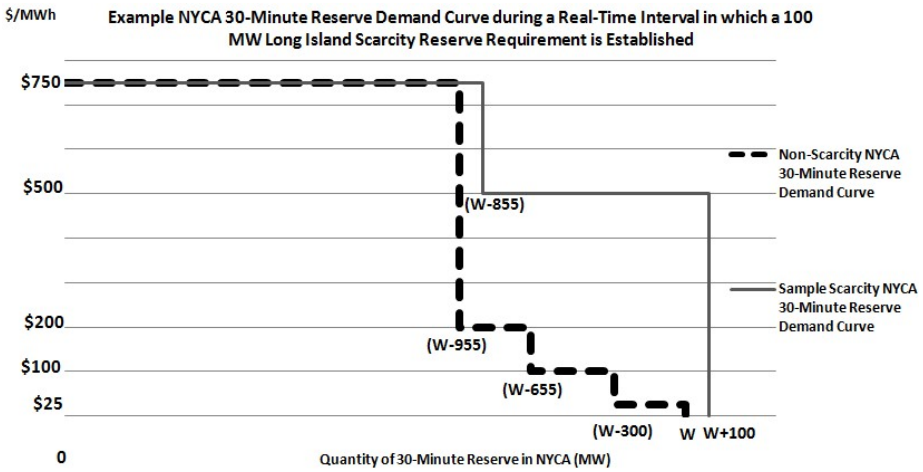
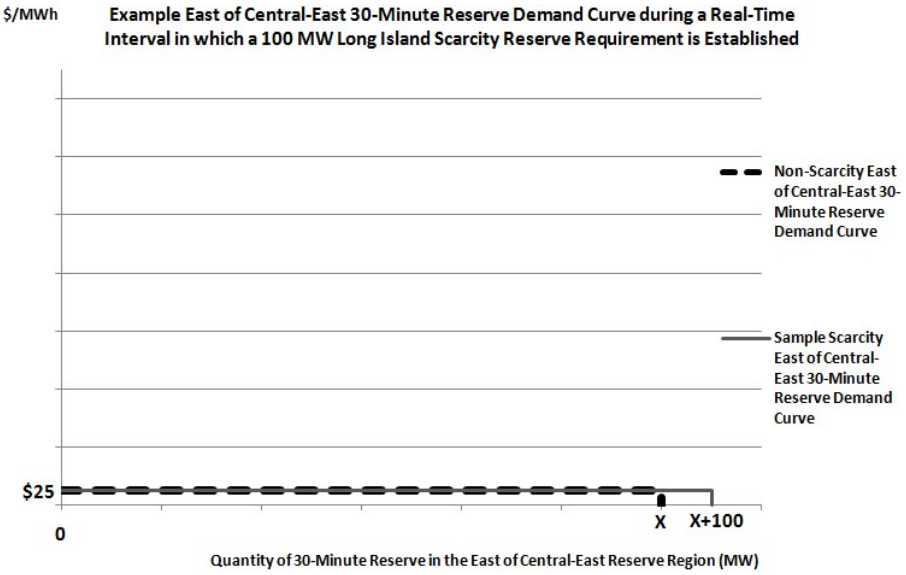

Example SENY 30-Minute Reserve Demand Curve during a Real-Time Interval in which a 100 MW NYC Scarcity Reserve Requirement is Established
$/MWh
$500
Non-Scarcity SENY 30-Minute Reserve Demand Curve
Sample Scarcity SENY 30-Minute Reserve Demand Curve
SENY
SENY + 100
Quantity of 30-Minute Reserve in SENY (MW)


Example NYC 30-Minute Reserve Demand Curve during a Real-time Interval in which a 100 MW NYC Scarcity Reserve Requirement is Established
$/MWh
$500
Non-Scarcity NYC 30-Minute Reserve Demand Curve
Sample Scarcity NYC 30-Minute Reserve Demand Curve
$25
100
Quantity of 30-Minute Reserve in NYC
NYC
NYC + 100

In the above example, no other 30-minute reserve demand curves are modified.





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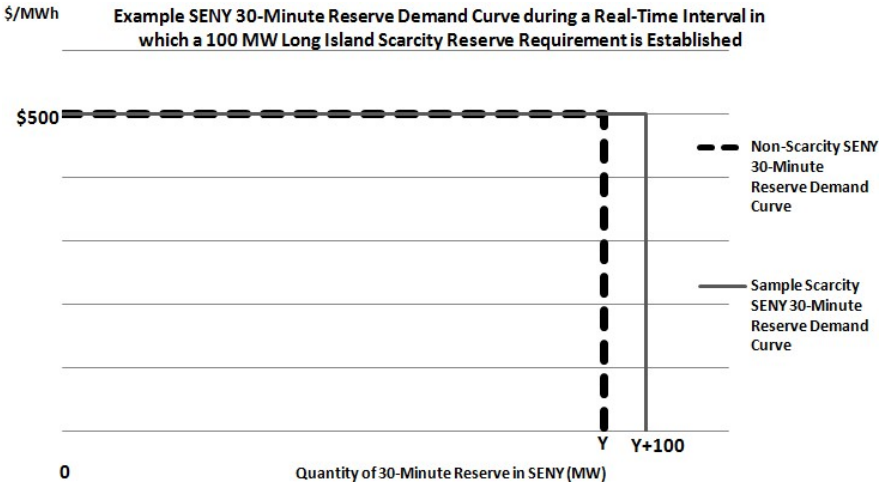

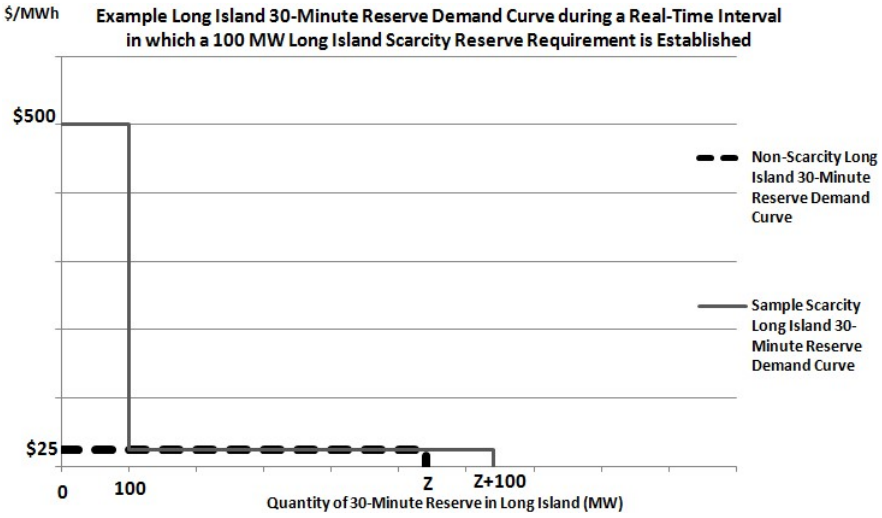

~~11.~~6. If a Scarcity Reserve Region is identified that is not NYCA, East of Central-East, Southeastern New York, New York City, or Long Island, then that Scarcity Reserve Region will have a single demand curve price of $500/MW for the applicable Scarcity Reserve Requirement relating thereto. Additionally:

a. The NYCA 30-minute reserve requirement will be increased by the Scarcity

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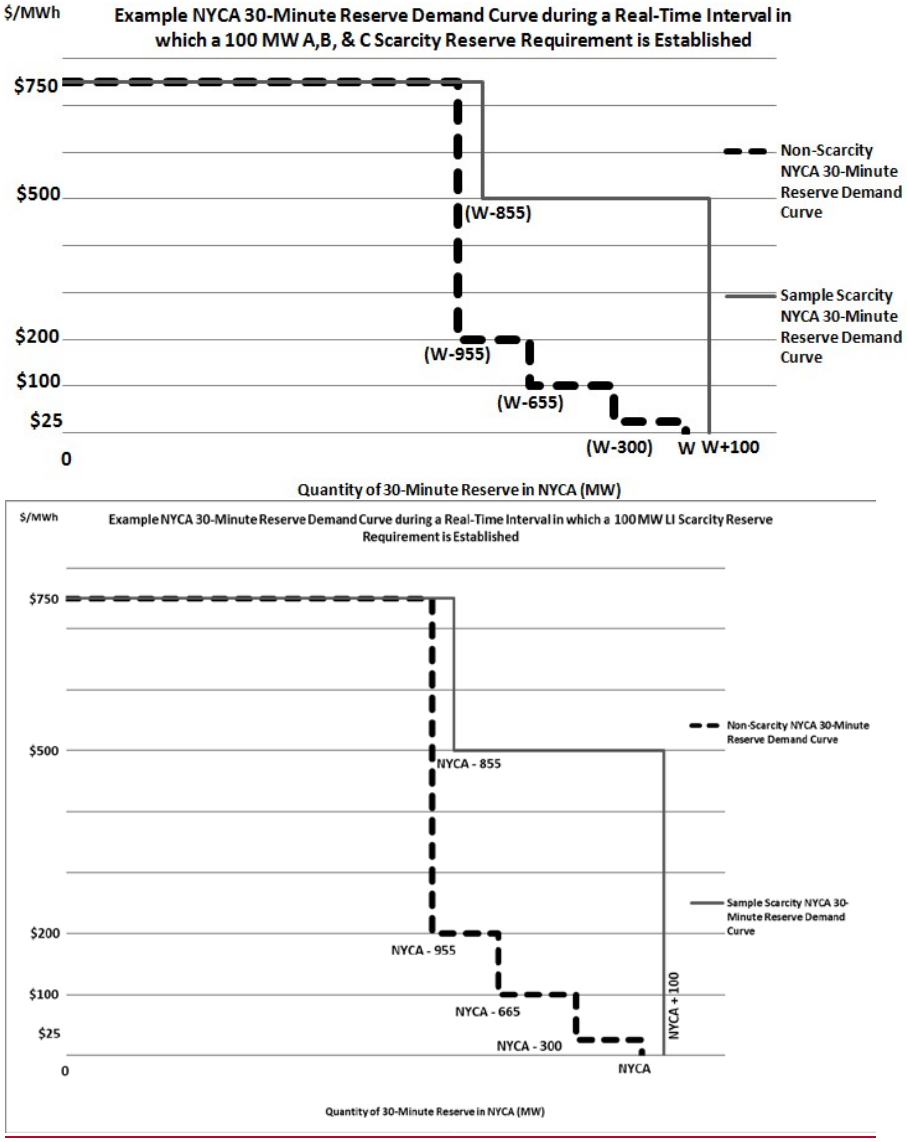
Reserve Requirement. If the quantity of 30-minute reserve that is provided in the NYCA exceeds the revised NYCA 30-minute reserve requirement minus 955 MW, but is less than or equal to the revised NYCA 30-minute reserve requirement, the corresponding price on the NYCA 30-minute reserve demand curve will be $500/MW. If the quantity of 30-minute reserve provided in the NYCA is less than or equal to the revised NYCA 30-minute reserve requirement minus 955 MW, the corresponding price on the NYCA 30-minute demand curve will be $750/MW.

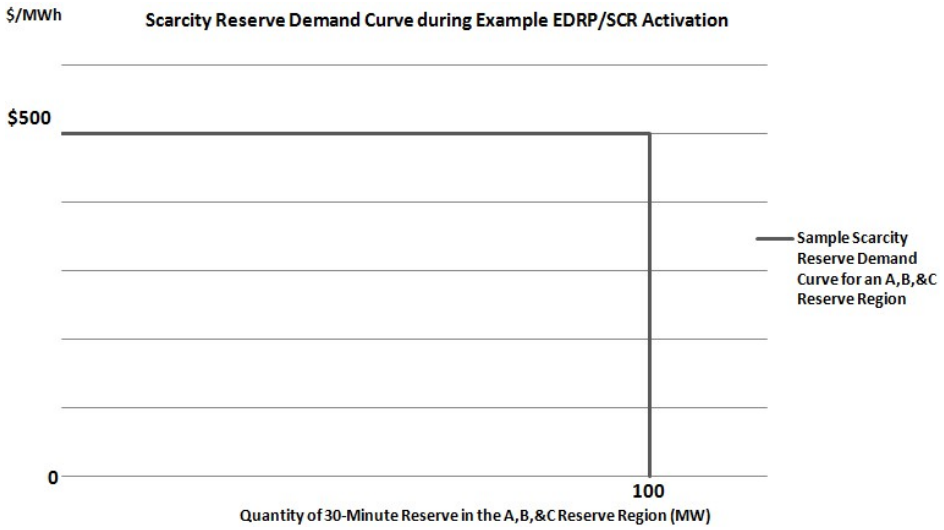
b. The East of Central-East 30-minute reserve requirement will only be increased by the Scarcity Reserve Requirement if all Load Zones included within the Scarcity Reserve Region belong to East of Central-East. If this is the case and the quantity of 30-minute reserve provided in East of Central-East is less than or equal to the revised East of Central-East 30-minute reserve requirement, the corresponding price on the East of Central-East 30-minute reserve demand curve will be $25/MW.

c. The Southeastern New York 30-minute reserve requirement will only be increased by the Scarcity Reserve Requirement if all Load Zones included within the Scarcity Reserve Region belong to Southeastern New York. If this is the case and the quantity of 30-minute reserve provided in Southeastern New York is less than or equal to the revised Southeastern New York 30-minute reserve requirement, the corresponding price on the Southeastern New York 30-minute reserve demand curve will be $500/MW.

For example, consider that a Scarcity Reserve Region that consists solely of Load Zones A, B, and

C is the only Scarcity Reserve Region identified, and that the additional Scarcity Reserve Requirement for that region is calculated as 100 MW for an interval. The applicable impacts to the affected 30-minute reserve demand curves during such real-time interval would be as follows (note that, in this example, because the Load Zones that comprise the Scarcity Reserve Region do not belong to ~~either~~ East of Central-East, ~~or~~ Southeastern New York, New York City, or Long Island no adjustments would be made to the otherwise applicable 30-minute reserve demand curves for such regions):


$/MWh
Example NYCA 30-Minute Reserve Demand Curve during a Real-Time Interval in which a 100 MW A,B, & C Scarcity Reserve Requirement is Established
$750
$500
$200
$100
$25
0
(W-855)
(W-955)
(W-655)
(W-300)
W
W+100
Non-Scarcity NYCA 30-Minute Reserve Demand Curve
Sample Scarcity NYCA 30-Minute Reserve Demand Curve
Quantity of 30-Minute Reserve in NYCA (MW)
$/MWh
Example NYCA 30-Minute Reserve Demand Curve during a Real-Time Interval in which a 100 MW LI Scarcity Reserve Requirement is Established
$750
$500
$200
$100
$25
0
NYCA - 855
NYCA - 955
NYCA - 665
NYCA - 300
NYCA
NYCA +100
Non-Scarcity NYCA 30-Minute Reserve Demand Curve
Sample Scarcity NYCA 30-Minute Reserve Demand Curve
Quantity of 30-Minute Reserve in NYCA (MW)



In the above example, no other 30-minute reserve demand curves are modified.

6.8.2. Operating Reserve and Regulation Service Demand Curves

The unit commitment and dispatch module used in both the SCUC and RTS systems utilizes demand curves to reflect shortages. The demand curves allow the program to relax the applicable requirement if the shadow cost needed to supply the requirement exceeds a preset value. The demand curve functionality is used for the reserve and regulation requirements. The following demand curves are implemented:

New York Region	Type	Demand Curve Amount (MW)	Demand Curve Price ($)
NYCA	Regulation	25.0 80.0 remainder	$25.00 $525.00 $775.00
NYCA	Spinning Reserve	All	$775.00
NYCA	10 Minute Reserve	All	$750.00
NYCA	30 Minute Reserve	300.0 655.0 955.0 remainder	$25.00 $100.00 $200.00 $750.00
Eastern	Spinning Reserve	All	$25.00

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New York (EAST)	10 Minute Reserve	All	$775.00
	30 Minute Reserve	All	$25.00
Southeastern New York (SENY)	Spinning Reserve	All	$25.00
	10 Minute Reserve	All	$25.00
	30 Minute Reserve	All	$500.00
New York City (N.Y.C.)	Spinning Reserve	All	$25.00
	10 Minute Reserve	All	$25.00
	30 Minute Reserve	All	$25.00
Long Island (LI)	Spinning Reserve	All	$25.00
	10 Minute Reserve	All	$25.00
	30 Minute Reserve	All	$25.00

~~6.15.~~6.9. Self-Supply

Transactions may be entered into to provide for Self-Supply of Operating Reserves. Except as noted in Section 15.4.8 of the *NYISO Service Tariff*, Customers seeking to Self-Supply Operating Reserves must place the Generator(s) supplying any one of the Operating Reserves under NYISO control. The Generator(s) must meet NYISO rules for acceptability. The amount that any such Customer will be charged for Operating Reserves will be reduced by the market value of the services provided by the specified Generator(s) as determined in the *NYISO Services Tariff*.

~~6.16.~~6.10. Operating Reserve Charge

Please refer to Rate Schedule 5 of the NYISO OATT, Rate Schedule 4 of the NYISO ~~Market~~ Services Tariff, and the Accounting and Billing Manual for Information about Operating Reserve
Charges.

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~~6.17.~~6.11. Failure to Provide Operating Reserve

There is no explicit penalty for failing to provide Energy or failing to provide a Demand Reduction when Suppliers are scheduled for Energy or a Demand Reduction by RTD. If the Supplier does not perform, the following will occur:

- RTD converted the reserve schedule to energy (i.e., the reserve schedule went to zero) and the unit would buy out of its day-ahead reserve commitment at the real-time reserve market clearing price.
- A Generator would not receive any payment for energy scheduled but not produced and the Generator may receive Persistent Undergeneration charges.
- A Demand Side Resource will have a reserve performance index calculated for each interval of its real-time demand reduction schedule as follows:

$$\text{Reserve PI}_i = \text{Min}\left[\left(\left(\text{ADR}_i / \text{RSR}_i\right) + .10\right), 1\right]$$

Where:

ADR_i = Average Actual Demand Reduction for interval *i*

If $\text{ADR}_i <= 0$ then set $\text{Reserve PI}_i = 0$

RSR_i = Ramped Scheduled Reduction for interval *i*

- The Reserve Performance Index is used in the Day-Ahead Margin Assurance Payment ("DAMAP") calculation which may reduce the DAMAP payments to Demand Side Resources. The result is that the Demand Side Resource may buy out of its Day-Ahead reserve position and not receive sufficient DAMAP payments to cover real time reserve market balancing costs.
- For more information, see *NYISO Accounting and Billing Manual* (available from the NYISO Web site at the following URL:
~~http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp~~ht tps://www.nyiso.com/manuals-tech-bulletins-user-guides)

~~6.18.~~6.12. Reserve Service Qualification and Performance Criteria

6.12.1. Reserve Qualified Resource Requirements

Any resource that meets the following criteria will be considered a Reserve Qualified Resource and may submit offers for Operating Reserves service. All Reserve Qualified Resources must:

- Have the appropriate control equipment installed and be capable of providing Operating Reserves service.
- Be capable of receiving and responding to automatic control signals on a 5 minute periodicity and must provide telemetered output data that can be scanned every 6 seconds.

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- Provide for all required interfaces to the Transmission Owner (TO) control centers as defined by the TO's as described in the TO-MP Interconnection Agreement.
- In order for a Demand Side Resource to provide Operating Reserves service the Demand Side Resource must take service from a qualified Load Serving Entity and all demand is subject to the energy settlements of the *NYISO Services Tariff* and *NYISO OATT*.
- Register the intent to provide Operating Reserves service with the Stakeholder Services department and provide all data required as defined in the Market Participant Registration Packet.
- Post all collateral requirements as defined in the *NYISO Services Tariff* Attachment K and Section 2 of the Market Participant Registration Packet.
- Successfully complete the pre-qualification performance test as described in section 6.12.2.

6.12.2. Pre-Qualification and Re-Qualification Performance Test

All participants requesting to become reserve suppliers and all participants that are required to re-qualify as reserve providers must successfully complete the pre-qualification performance test.

- Market Participants must notify the Stakeholder Services department of their intent to complete a reserve pre-qualification test. All qualification criteria defined in section 6.12.1 must be completed prior to the test request.
- Stakeholder Services will coordinate with Grid Operations to schedule the test.
- The Market Participant will be notified by a NYISO Stakeholder Services representative a minimum of two days prior to the test period indicating the dates that will be subject to prequalification test.
- Test participants will be instructed to submit reserve and energy bids for specified dates and for all hours that the Resource is capable of changing energy schedules or modifying demand in real time at the request of the NYISO.
- Operations will conduct a random audit(s) as described in Technical Bulletin 142, Generator Performance Audit, with the exception, as described below, for testing of non synchronous reserves. Actions based on the results of the audit as a pre-qualification test described in Technical Bulletin 142, Generator Performance Audit will be replaced with actions as defined in this section.
- Operations will select providers that are qualifying non-synchronous reserve by randomly scheduling the resource within the first 14 days after notifying Stakeholder Services that they would like to perform a test. The participant must be scheduled to provide the service in order for Operations to schedule the unit for energy or demand response.
- Actions in the event of a failed pre-qualification audit (test)

1. Operations will complete all standard audit documentation

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2. Operations will inform Stakeholder Services and MMA of the results of the audit (test)
3. Stakeholder Services will notify the customer indicating the results of the test. If the test participant fails the test, Stakeholder Services will remove all reserve bidding privileges.
4. Prior to requesting a re-test the test participant must provide an explanation to MMA describing the cause of the failed prequalification test. Documentation should be sent to;

Reference_Price_Update@NYISO.com

Subject line of the e-mail should state "Reserve Performance Audit"

5. Market Mitigation and Analysis will notify Stakeholder Services when the test participant is authorized to perform another test.

- Test participants will be paid for all reserve provided during the test as if the participant was a qualified reserve supplier.

The test participant will be responsible for any balancing payments due to poor performance during the test.

7. Black Start Capability Service

This section describes the black start capability service.

7.1. Description

Black start capability represents the key Generators that, following a system-wide blackout, can start without the availability of an outside electric supply and are available to participate in system restoration activities that are under the control of the NYISO or, in some cases, under local Transmission Owner Control. If a partial or system-wide blackout occurs, these units assist in the restoration of the New York Control Area (NYCA). Specific generating units, identified in the NYISO Restoration Plan or, in specific Transmission Owners' local restoration plan(s), have the capability and training required to start up without the presence of a synchronized grid to provide the necessary auxiliary station power.

Generators are required to test their black start capability for each Capability Year. With due regard for reliability considerations and subject to approval by the NYISO and by the

Transmission Owner, if a generator is part of a Transmission Owner's system restoration plan, a test performed by black start facilities within one month beyond the Capability Year test period, or longer in force majeure cases, shall be considered a valid test for that Capability Year. For black start providers under the Consolidated Edison black start and system restoration plan, the Capability Year test period is from May 1st to April 30th, excluding June, July, and August. The test period for providers other than those in the Consolidated Edison black start and system restoration plan is from May 1st to April 30th.

The NYISO Restoration Plan and/or Transmission Owner restoration plan(s) are implemented if a partial or complete system blackout occurs. The NYISO selects the generating resources with black start capability by considering the following operating characteristics:

- electrical location in the NYCA
- start up time: from NYISO order to start to minimum output
- maximum response rate (MW/minute) above minimum output
- maximum power output

7.2. Source and Scheduling of Service

LSEs must purchase black start capability service from the NYISO. Generation Resources providing this service must successfully pass the test for black start capability.

The NYISO identifies the generating units that are in critical areas for NYS Power System restoration. During system restoration activities, the NYISO manages and deploys the black start capability, as needed, depending on the specific situation.

The NYISO develops and periodically reviews the Black Start Restoration Plan for the NYS Power System. The NYISO may amend this restoration plan and determine black start requirements to account for changes in system configuration if the NYISO determines that additional black start resources are needed. The NYISO has the flexibility to seek bids for new resources whenever it amends the current plan.

Although the NYISO plan will restore a major portion of the state electric system, portions of the local Transmission Owner restoration plans may require some additional black start Generators, which are located in local Transmission Owner areas and which are not presently listed in the NYISO restoration plan. The NYISO will make payments for local area black start capability directly to the generating facilities that provide that service. Those payments will be determined under the terms of Rate Schedule 5 of the *NYISO Services Tariff*. The LSEs in those local Transmission Owner areas will be additionally charged for that black start capability Service by the NYISO. Generating facilities, which are obligated to provide black start service as a result of divestiture contract agreements, will not receive NYISO payments for that service if they are already compensated for such service as part of those divestiture contracts.

7.3. Payment for Service

Please refer to Rate Schedule 6 of the *NYISO OATT*, Rate Schedule 5 of the *NYISO Services Tariff*, and the *Accounting and Billing Manual* for information about payments for Black Start.

7.4. Black Start Service Procedures

The following procedures apply to black start capability service:

NYISO Actions

The NYISO Staff shall perform the following:

1. On a periodic basis, determine the amount and location for black start capability generation.
2. Select the Generators for black start capability based on location, price, and quality of supply.
3. Notify the selected Generators for black start testing.

Transmission Owner Actions

The Transmission Owner actions are found in Section 3 of the System Restoration Manual.

Black Start Generator Actions

The Black Start suppliers shall perform the following:

1. Those that are part of the ISO Plan, not including existing Generators under the Consolidated Edison Plan, will provide the NYISO with embedded cost information on an annual basis.
2. All black start providers must conduct performance testing annually during their respective test periods. All black start providers must submit testing data to the NYISO upon request. Following its completion of a black start test, a black start provider must provide the NYISO with its plan, within a reasonable time, to mitigate any deficiencies in its generating unit's black start capability identified during the performance of its test.
3. During black start tests of steam units, the ability of gas turbine units to control frequency and voltage while isolated from the transmission system shall be monitored by the Generator Owner.
4. All suppliers on an annual basis, provide a letter to the NYISO confirming that they:
    a. Identify and maintain a list of critical components in their black start facilities (e.g., batteries, diesel back-up generators, inverters, etc.) and perform tests to verify the condition of these critical components in accordance with good industry practice.
    b. Have developed test procedures and accordingly tested their black start facilities for each Capability Year.
    c. Have met the black start provider training requirements.

8. Automatic Fuel Swap Capability Testing

8.1. Description

The *NYISO* requires that Generator Owners of combined cycle units that are part of the Con Edison Minimum Oil Burn ("MOB") program and have the ability to automatically swap from natural gas to a liquid fuel source in the event of the sudden interruption of gas fuel supply or loss of gas pressure or unavailability of gas supply to the generator ("Applicable Unit") test that capability. The current list of dual fuel units that are part of the Con Edison MOB program are published in the seasonal reports presented to the NYISO Operating Committee.

8.2. Automatic Fuel Swap Testing Requirements

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The test by each Generator Owner of an Applicable Unit shall demonstrate the ability to swap from natural gas to oil following an actual or simulated loss of gas pressure, or an operator-initiated swap, within a time consistent with the design parameters for the Applicable Unit, not to exceed 60 seconds, while remaining synchronized to the transmission system and in stable operation.

8.3. Automatic Fuel Swap Testing Frequency

Each Generator Owner must, at least once each NYISO Capability Period (Summer and Winter), successfully test or demonstrate the ability each Applicable Unit to perform their intended function. The results of a successful, real-time automatic fuel swap can be utilized to satisfy the testing requirement for the Capability Period in which it occurs.

Tests must be coordinated with the NYISO and Con Edison.

8.4. Automatic Fuel Swap Testing Procedures

The Generator Operator must develop and implement specific testing procedures for each Applicable Unit to demonstrate they are able to perform their intended function. These procedures shall be provided to the NYISO Manager of Operations Engineering and Con Edison. In the capability period following each automatic fuel swap test, updated restoration procedures or verifications of continued applicability of previously supplied procedures shall be provided to the NYISO and Con Edison.

8.5. Documentation of Automatic Fuel Swap Testing and Mitigation of Failed Tests

Generator Operators of Applicable Units shall document the date, start-time, and duration of all tests, and indicates if the tests meet the criteria in the unit's Automatic Fuel Swap testing procedure. In the capability period following each automatic fuel swap test, dDocumentation of a successful test shall be provided to the NYISO Manager of Operations Engineering. If the automatic swap from natural gas to liquid fuel test is not successful, the Generator Owner shall identify the causes of the failure, shall take steps to undertake remedial actions that are necessary to resolve the failure, and keep the NYISO and Con Edison informed as to the progress of its remedial actions. If an Automatic Fuel Swap Test is not successful, the Generator will have a reasonable opportunity to reschedule and conduct a subsequent test following completion of remedial actions.

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Attachment A Voltage Support Service Qualification Forms

New York ISO

Attachment A-1

VSS Qualifications Form

Attached to this form is: ☐ Generator or synchronous condenser documentation, including the manufacturer's model number or equivalent data as determined by the NYISO, manufacturer's specifications, a block diagram and associated data, and a generator reactive capability data sheet ("D-curve"). ☐ Documentation that demonstrates that the resource(s) listed below have an Automatic Voltage Regulator (AVR), including AVR manufacturer model number, manufacturer's specifications, a voltage regulator block diagram and associated data.

The resource(s) listed below will participate in Voltage Support Ancillary Service under the direction of the NYISO and agree to comply with all applicable rules and procedures associated with NYISO voltage and Reactive Power control.

Unit Name	Station Name	Generator's Transmission Owner	NYISO MIS PTID	Type (Generator, Synchronous Condenser, etc.)	NYISO ICAP DMNC, UCAP* or Nameplate Rating	Generator Model and Number	AVR Model Number

Market Participant Signature: _____ Date: _____

Title: _____ Organization: _____

NYISO Approval: _____

Title: _____ Date: _____

*UCAP rating is only used for Limited Control Run-of-River Hydro Resources.

New York ISO

Attachment A-2

Request for Identical Treatment

For a resource's Voltage Support Service test to be applied to identical resources, the following criteria must be met:

- Resources must be rated at less than 60MW manufacturer's nameplate
- Resources must be at the same site
- Resources must be electrically identical
- Resources must be stand alone (not part of a combined cycle unit, etc.)

The resources listed below are identical and are requesting that the test results from one resource apply to all the resources listed.

Unit Name	Station Name	NYISO MIS PTID	Type (Gen, Sync Cond, etc.)	Manufacturer	Model #	Nameplate MW	Nameplate MVar	Rated Power Factor	Interface Bus Name

Market Participant Signature: _____ Date: _____

Title: _____ Organization: _____

NYISO Approval: _____

Title: _____ Date: _____

Attachment B Performance Adjustment for Regulating and Non-Regulating Suppliers

Please refer to Rate Schedule 3 of the NYISO OATT, Rate Schedule 3 of the NYISO ~~Market~~ Services Tariff, and the Accounting and Billing Manual for information about Performance Adjustment for Regulating and Non-Regulating Suppliers.

Attachment C Regulation Performance Audit Standards

The Regulation Response Audit form, as appropriate, will be completed after each specific audit.

Regulation Response Audit

INDIVIDUAL RESOURCE REGULATION PERFORMANCE RESPONSE TEST

Type of test: Regulation Performance Pass_____ Fail_____

This is a NYISO individual resource audit of _____regulation performance.

The resource has a Regulation Capacity Response Rate of _____ MWs per minute.

The resource has a Regulation Movement Response Rate of _____ MW per 6 seconds.

The audit start time: _____.

The audit end time: _____.

Time weighted Performance Index:_____

Date_____

Comments and or actions taken _____

Audit Requested By:

Name: _____

Department:_____