

# Ancillary Services

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**Kasia Shunk**

Senior Market Trainer, Market Training, NYISO

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Remote Learning

# Ancillary Services

## ■ SESSION OBJECTIVES:

attendees will be able to...

- Identify
  - Meaning for Cost Based
  - Three Associated Services
- Identify
  - Meaning for Market Based
  - Three Associated Services

# Ancillary Services

## ■ SESSION OBJECTIVES:

- Distinguish between Withdrawals & Injections
- Explain RT Actual Load & RT Load Ratio Share and their relationship to Ancillary Services
- For Each Ancillary Service:
  - Explain the Purpose
  - Identify the Suppliers
  - Explain the Process for Implementing
  - Explain the associated Supplier Settlements
  - Identify the Recipients
  - Explain the Recipient Charge Allocations

# Ancillary Services

- Ancillary Services support the transmission of energy from resources to loads, while maintaining reliable operation of the NY State Power System.
- All Ancillary Service providers must be scheduled by the NYISO.

# Ancillary Services

- **NYISO Coordinates the Provision of Ancillary Services**
  - Select Providers
- **NYISO Arranges for the Supply of Ancillary Services**
  - Schedule Providers
- **NYISO Directs Actions of Ancillary Resources**
  - Direct Providers

# Ancillary Services

- **Some Ancillary Services are Provided at Cost-Based Prices**
  - Scheduling, System Control, and Dispatch
  - Voltage Support
  - Black Start Capability
  
- **Some Ancillary Services are Provided at Market-Based Prices**
  - Regulation Service
  - Operating Reserve
  - Energy Imbalance

# Ancillary Services

## ■ New Definitions/Terms

- Injections
  - Represents Supply Side
- Withdrawals
  - Represents Load Side
- RT Actual Load
  - Actual MWh Injected or Withdrawn in RT
- RT Load Ratio Share
  - Percentage/Portion of Total NYCA Load

# Ancillary Services -

## RT Load Ratio Share Example

- Total NYCA Load
  - 1,000 MWhs
- LSE 123's RT Act Ld
  - 250 MWhs
- Total \$s charged to LSEs
  - \$5,000
- RT Load Ratio Share
  - $250/1,000 = 0.25$  or 25%
- LSE 123's Share of \$
  - $5,000 \times 0.25 = \$1,250$



# Ancillary Services



# Cost Based - Rate Schedule 1

- **Scheduling, System Control, and Dispatch (S,SC, & D)**
  - Purpose : Recovering NYISO Cost of Operations
    - Costs Associated with the Operation of the NYS Transmission System by the NYISO
    - Costs Associated with the Administration of the Tariffs by the NYISO

# Cost Based - Rate Schedule 1

- **NYISO Costs of Operations Recovered Through Two Tariffs**
  - OATT (Open Access Transmission Tariff)
  - MST (Market Services Tariff)

# Cost Based - Rate Schedule 1

## ■ Cost Recovery Through OATT/MST

- Transmission Service Market Administration
- Transmission System Engineering & Planning
- Transmission Service Billing & Accounting
- System Scheduling, Control, & Dispatch Costs
- NYCA Transmission System Studies
- Residual Adjustments
- FERC Fees

# Cost Based - Rate Schedule 1

- **Cost Recovery Through OATT/MST**
  - LBMP Market Administration
  - Administration of ICAP Market
  - Control Area Services Administration
  - NYISO General & Administrative Expense
  - Market Monitoring Program
  - Activities Related to Maintenance of Reliability

# Cost Based - Rate Schedule 1

## ■ Recovery of Schedule 1 Costs

- Part 1: NYISO Embedded Costs
  - Total NYISO costs to be recovered divided by Total forecasted MWh Volume results in the fixed service rate
  - 2025 Service Rate: \$1.306/MWh  
(combined OATT & MST Tariffs)
  - 72% billed to load and other withdrawals
  - 28% billed to generators and other injections

# Cost Based - Rate Schedule 1

## ■ Recovery of Schedule 1 Costs

### • Part 1 cont'd: NYISO Embedded Costs

$$\begin{array}{lll} \text{NYISO Costs to be Recovered} & \$\underline{202,000,000} & = \$1.306/\text{MWh} \\ \text{Forecasted MWh Volumes} & 154,700,000 \text{ MWh} & \end{array}$$

72% of \$1.306 charged to withdrawals = \$0.940320

28% of \$1.306 charged to injections = \$0.365680

\*\*\*Rate assessed on RT Actual Load/Injection MWh

# Cost Based - Rate Schedule 1

## ■ Recovery of Schedule 1 Costs

- Part 2: Costs assessed to Non-Physical Market Activity
  - Virtual Trading
    - Rate of \$0.1666 per Cleared MWh
  - Transmission Congestion Contracts
    - Rate of \$0.0159 per Settled TCC MWhs
  - Demand Response
    - Special Case Resources (SCR)
    - Emergency Demand Response Providers (EDRP)
      - » Rate Schedule 1 *Injection* Rate per MWh



# Cost Based - Rate Schedule 1

## ■ Recovery of Schedule 1 Costs

- Part 3: FERC Fees
  - Charge associated with recovery of annual FERC Fees
- Physical Market Activity assessed 94%
  - Injections 28%
  - Withdrawals 72%
- Non-physical Market Activity assessed 6%
  - Virtual Trading 34.7%
  - Transmission Congestion Contracts 65.3%

# Cost Based - Rate Schedule 1

## ■ Recovery of Schedule 1 Costs

- Part 4: Uplift Charges and Residual Adjustments
  - Uplift Charges result from additional payments made that are above market revenue
  - Uplift Charges billed to all energy withdrawals including wheel throughs and exports
  - Residuals result from over collection or financial imbalances
  - Residual Adjustments allocate cash imbalances to LSEs
  - 100% billed to load and other withdrawals
    - Rate assessed on RT Load Ratio Share

# Cost Based - Rate Schedule 1

- **Uplift Charges– Contributing Factors**
  - Bid Production Cost Guarantee
  - DAM Margin Assurance
  - Transaction Import Curtailment Supplier Guarantee
  - Financial Impact Charge
  - Virtual Transactions

# Cost Based - Rate Schedule 1

## ■ Residual Adjustments – Contributing Factors

- Marginal Losses
  - Revenue collected from Transmission Customers in excess of payments to Power Suppliers as a component of the LBMP or TUC
- Change in Transfer Capability
  - Costs or savings associated with re-dispatch of generators due to changes in Transfer Capability between Day Ahead schedules & RT dispatch
- Inadvertent Interchange
  - Costs or savings resulting from inadvertent interchanges between NYCA and neighbors

# Cost Based - Rate Schedule 1

## ■ Residual Adjustments – Contributing Factors

- Emergency Transactions
  - Costs or revenues from emergency transactions with neighboring control areas
- Metering Adjustment
  - Revenue excess/deficiency from metering errors
- Forecast vs. Actual System Load
  - Deviations between actual system load & the 5-minute load forecasts used by RTD, resulting in either more or less energy needed to meet system load

# Cost Based - Rate Schedule 1

## ■ Residual Adjustments – Contributing Factors

- Excess Energy Amount
  - Energy supplied in excess of the amount requested by NYISO
- Balancing Congestion
  - Cash Imbalance in NYISO's Balancing Market Congestion settlements
- Load to Bus Distribution
  - Revenue excess/deficiency from Transmission Customers due to differences between their actual and assumed load distribution used to compute their real time settlements

# **Cost Based – Rate Schedule 2 Voltage Support Service (VSS)**

# Cost Based - Rate Schedule 2

## ■ Voltage Support Service

- Purpose:

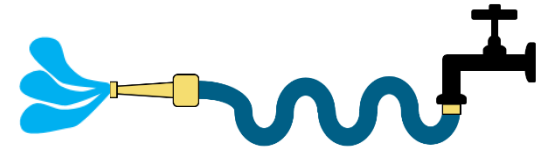
- Ensures sufficient supply of Reactive Power to maintain desired voltage levels on the NYCA Transmission System in real time operations
- Must be provided to support all Transactions on the NYS Transmission System



# Cost Based - Rate Schedule 2

## ■ Voltage Support Service

- Proper Voltage Support (Force/Pressure) is Necessary for Delivery of Electrical Energy
- Reactive Power (MVar) is:
  - produced to raise voltage
  - absorbed to lower voltage



# Cost Based - Rate Schedule 2

## ■ Voltage Support Service Suppliers

- VSS Accomplished Through use of On-Line Resources:
  - Generators
  - Synchronous Condensers
  - Other Qualified Providers
- Supplier Program Participation is Voluntary
- Excitation Outputs are Increased/Decreased to Produce/Absorb Reactive Energy
  - MVar Production = Lagging (+)
  - MVar Absorption = Leading (-)

# Cost Based - Rate Schedule 2

- **Demonstrating Supplier MVar Capability**
  - Resources Perform Annual Reactive Power Capability (MVar) Testing
    - Resource's ability to Produce/Absorb Reactive Power (MVar) limited by Heating Considerations
      - Scheduled with NYISO
      - Coordinated with TOs
  - MVar Capability is Established for Unit
  - Test Data Submitted to NYISO
    - Includes capability "D" curve with MW values and associated lagging and leading MVar limits

# Cost Based - Rate Schedule 2

## ■ Implementing Voltage Support Service

- Resources must
  - Have Automatic Voltage Regulator (AVR)
  - Successfully perform MVAR capability testing
    - Production - Lag Var
    - Absorption - Lead Var
  - Maintain specific voltage level as directed by NYISO/TOs
- NYISO
  - Coordinates bus voltage profiles
  - Coordinates voltage set points

# Cost Based - Rate Schedule 2

## ■ Voltage Support Service Supplier Settlements

- VSS Suppliers Receive Weekly Payments based on an Annual Rate of \*\$3,436.30 per MVAR per year

1) Annual VSS Payment =

$$(\text{Lag MVAR} + \text{Lead MVAR}) \times (\$3,436.30)$$

Lag MVAR = Approved Lagging Test Value

Lead MVAR = Approved Leading Test Value

2) Hourly VSS Payment =

$$\{(\text{Annual VSS Payment} / 12) / \# \text{ Hrs in Month}\} \times \text{AVR Status}$$

AVR Status = 1 for fully functional AVR or 0.5 for non-functional AVR

\*2025 Rate

# Cost Based - Rate Schedule 2

- **Voltage Support Service Supplier Settlements**
  - ICAP vs. Non-ICAP
    - ICAP Providers Receive Full VSS Payment
      - Per payment calculation on prior slide
    - Non-ICAP Providers Receive Pro-Rated Payment based on Unit's Time in Service
      - Refer to examples on next slide
  - Synchronous Condensers Receive Pro-Rated Payment Based on Time in Service

# Cost Based - Rate Schedule 2

## ■ Voltage Support Service Supplier Settlements

### Example Settlements:

- Example VSS Pymnt for ICAP Provider  
$$\{(\$51,840 / 12) / 720\} \times 1 = \$6.00 \text{ Hrly VSS}$$
- Example VSS Pymnt for Non-ICAP & Synchronous Condensers  
$$\{(\$51,840 / 12) / 720\} \times 1 \times 0.50 \text{ Time in Service} \\ = \$3 \text{ Hrly VSS}$$

# Cost Based - Rate Schedule 2

- Voltage Support Service Supplier Settlements
  - VSS Lost Opportunity Cost
    - If NYISO dispatches or directs resource to reduce MWs to produce more MVARs then resource may be eligible to receive LOC payment
      - VSS LOC payment calculation captures:

(Revenue \$ for Energy MWs not produced) – (the Avoided Cost \$ from not producing those same MWs)



# Cost Based - Rate Schedule 2

- Voltage Support Service Recipients
  - VSS Costs allocated to
    - Internal Loads
    - Exports
    - Wheel-Throughs
  - VSS is Automatically Assessed

# Cost Based - Rate Schedule 2

- **Voltage Support Service Recipient Charge**
  - Annual Rate Established
    - Based on Estimated Annual VSS Costs and Estimated Load; rate is (\$/MWh)
  - Recipient's Charge is based on Their Actual Real-Time Load Consumption
    - $(\$/\text{MWh}) \times \text{MWh}$

# Cost Based - Rate Schedule 2

## ■ Voltage Support Service Recipient Charge

*Total 2025 NYISO VSS Payments* \$80,942,240 = \$0.52

*Forecasted MWh Volumes* 154,700,000 MWh

Total 2025 VSS Payments consist of:

Projected '25 NYISO VSS payments to Generators

Projected '25 NYISO VSS payments to non-generator VAR suppliers

Projected '25 VSS LOC payments

2024 Over/Under collection of VSS payments

# **Cost Based – Rate Schedule 6 Black Start Service**

# Cost Based - Rate Schedule 6

## ■ Black Start Service

- Purpose : NYCA System Restoration
  - Represents Generators capable of starting without an outside electric supply
    - Following a system-wide blackout
  - Available to participate in system restoration



# Cost Based - Rate Schedule 6

- **Black Start Service Suppliers**
  - Resources Selected According to Following Considerations:
    - Location in grid
    - Startup time
    - Response rate
    - Maximum output

# Cost Based - Rate Schedule 6

## ■ Black Start Service Suppliers

- Participant Requirements:
  - Generator Owners Certify Annually
    - Critical Components are Maintained
  - Statewide Participants Annually Submit Cost Information
    - O&M and Personnel (\$)
  - Service Participants Adhere to Commitment Period Time-Lines

# Cost Based - Rate Schedule 6

## ■ Implementing Black Start Service

- NYISO
  - Develops & Reviews Black Start Restoration Plan for NYS
  - Identifies Generating Units in Critical Areas
  - Manages and Deploys Black Start Service
  - Seeks new Bids as Needed
- NYISO and/or TO Restoration Plans are Implemented if Partial or Complete System Blackout occurs



# **Black Start - Priorities in Restoration**

- Energizing the backbone transmission path of the NYS Power System
- Synchronizing the NYS Power System with the interconnection.
- Restoring off-site power supplies to nuclear power plants.
- The next priority shall be load restoration.
- If there is limited energy available within the NYCA, preference shall be given to generating station startup, followed by the restoration of the high-density load portions of the system.

# Cost Based - Rate Schedule 6

## ■ Black Start Service Supplier Settlements

- Payments are made to Suppliers
  - Included in NYISO State-Wide or Local Black Start Restoration Plan
- Daily Black Start Payment Calculated as Follows:
  - Statewide & Local =  
 **$\text{Annual Cost \$} / \# \text{ Days in Previous Yr May 1}^{\text{st}} \text{ to April 30}^{\text{th}}$**
  - Con Ed Providers =  
 **$\text{Annual Compensation \$} + \text{Cost \$} / \# \text{ Days in Previous Yr May 1}^{\text{st}} \text{ to April 30}^{\text{th}}$**

# Cost Based - Rate Schedule 6

- **Black Start Service Recipients**
  - Black Start Service Costs allocated to:
    - Internal Load (excludes exports & wheel throughs)
    - Local Black Start Charges are assessed only to LSEs in applicable Transmission District

# Cost Based - Rate Schedule 6

## ■ Black Start Service Recipient Charge

**Hr Total NYISO Black Start Cost \$ x RT Load Ratio Share**

- Hourly Total NYISO Black Start Cost \$
  - Total \$s to be paid to Black Start Service Suppliers
- Based on each internal load's Real-Time Load Ratio Share

## True or False:

Both physical and non-physical type market participants are allocated Rate Schedule 1...

**True**

**False**

## True or False:

All generators capable of providing voltage support service must participate in NYISO's VSS program...

**True**

**False**

## True or False:

Just like NYISO's voltage support program, black start capable generators may sign up to participate in the NYISO's Black Start Service Program...

**True**

**False**

# Ancillary Services

Market Based

Regulation



Energy Imbalance

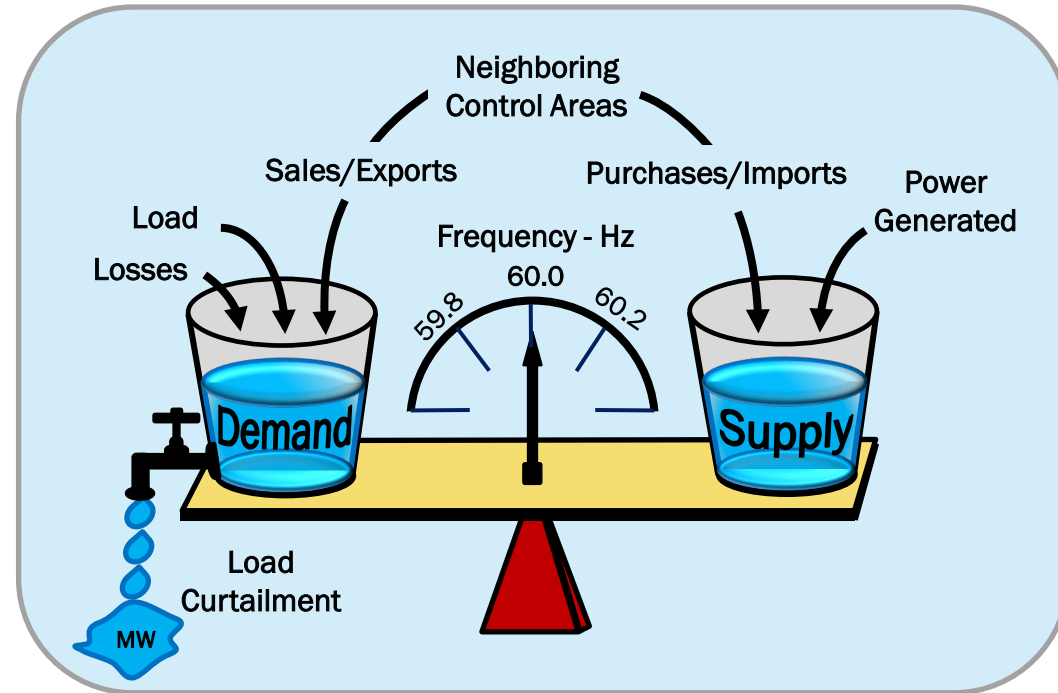
Reserves



# Market Based - Rate Schedule 3

## ■ Regulation & Frequency Response Service

- Necessary for the continuous balancing of resources with load - supply and demand balance
- Assists in maintaining scheduled Interconnection Frequency at 60 Hz



# Market Based - Rate Schedule 3

## ■ Regulation Response Service Requirements

NYISO Regulation Requirements [MW]

Hour Beg	April-May	June-August	September-October	November-March
0	175	225	175	200
1	175	175	175	175
2	175	175	175	175
3	175	175	175	175
4	225	225	225	175
5	275	275	275	225
6	325	325	325	275
7	375	375	400	325
8	375	400	450	375
9	325	350	400	325
10	275	300	350	275
11	250	275	300	250
12	300	300	300	250
13	300	300	300	250
14	325	325	350	275
15	350	350	325	300
16	300	350	300	275
17	250	300	250	300
18	250	250	275	275
19	275	250	250	250
20	250	250	250	200
21	200	250	250	225
22	200	275	200	200
23	200	275	225	200

# Market Based - Rate Schedule 3

## ■ Regulation & Frequency Response Service

- Regulation is accomplished by scheduling Resources including qualified:
  - Generators
  - Limited Energy Storage Resources (LESRs)
  - Energy Storage Resources (ESRs)
  - Demand Side Resources (Regulation Service Suppliers)
  - Aggregations
- Output may be raised or lowered to follow moment by moment changes in load

# Market Based - Rate Schedule 3

## ■ Regulation & Frequency Response Service

- Regulation is bid in by Resources that:
  - Have installed equipment capable of responding to six second signals
  - Bid as 'Flexible' Supplier
- Criteria considered in Co-Optimization
  - Energy Bids
  - Regulation Service Bids
    - Capacity Bid MW & Price
    - Movement Bid Price

# Regulation Bidding

Mock  
Generator Bid Page

Generator Bid

Generator Name:

ESR Beginning Energy Level MWh

Fuel Type:

Burdened Fuel Price (\$/mmbtu)

Bid Date

(mm/dd/yyyy hh:mi)

Num of Hours

Market

Expiration (DAM only)

(mm/dd/yyyy hh:mi)

Energy Bid

CSR Injection Limit (MW) <div></div>		CSR Withdrawal Limit (MW) <div></div>		CSR Outage Type <div></div>					
Lower Storage Limit (MWh) <div></div>		Upper Storage Limit (MWh) <div></div>		ESR Energy Management Mode <div><input type="radio"/> ISO <input type="radio"/> Self</div>		Lower Operating Limit (MW) <div></div>		ESR Outage Type <div></div>	
Upper Operating Limit (MW) <div></div>				Emergency Upper Operating Limit (MW) <div></div>		Minimum Generation (MW) <div></div>		Minimum Generation Cost (\$) <div></div>	
Self Scheduled (MW)				Unit Operations		Host Load (MW) <div></div>		Start-Up Cost (\$) <div></div>	
<div><div>00 Minute MW<div></div></div><div>15 Minute MW<div></div></div><div>30 Minute MW<div></div></div><div>45 Minute MW<div></div></div></div>				<div><input type="radio"/> ISO Committed Flex <input type="radio"/> Self Committed Flex <input type="radio"/> Self Committed Fixed <input type="radio"/> ISO Committed Fixed</div>					

Bid Curve (Block Format)

MW (Basepoint)	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
\$/MW	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
\$/MW (Opportunity Cost)	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>

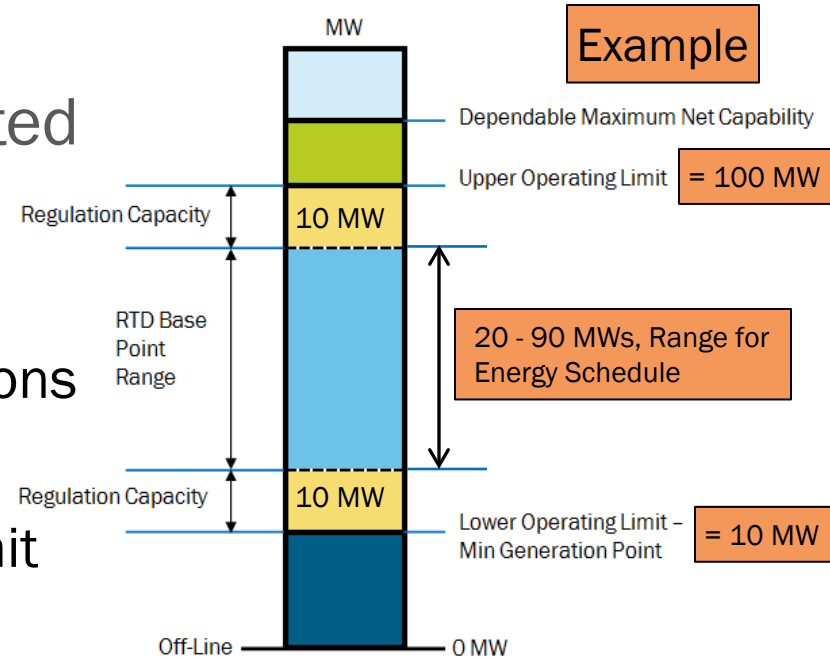
Ancillary Services

Item	MW's	\$/MW
10 Minute Spinning Reserves	<div></div>	<div></div>
10 Minute Non-Synchronized Reserves	<div></div>	<div></div>
30 Minute Spinning Reserves	<div></div>	<div></div>
30 Minute Non-Synchronized Reserves	<div></div>	<div></div>
Regulation Capacity	<div></div>	<div></div>
Regulation Movement	<div></div>	<div></div>

# Market Based - Rate Schedule 3

## ■ Regulation Scheduling

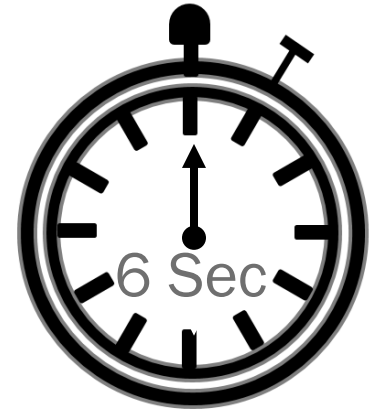
- Regulation Capacity is allocated to Resources scheduled to supply
  - Capacity comprised of two regions
    - Upper
      - » Bound by Upper Op Limit
    - Lower
      - » Bound by Min Gen Point



# Market Based - Rate Schedule 3

## ■ Implementing Regulation Response

- Respond to 6 second base points
  - Automatic Generator Control base points (AGC)
- Required to perform within certain tolerance level of AGC base points
  - Performance Index (rating of 0-1)



***\*\*Non-Regulating Units respond to 5-minute base points\*\****

# Market Based - Rate Schedule 3

- **Implementing Regulation Response**
  - Performance Tracking
    - NYISO uses Performance Tracking System (PTS)
      - Monitors Resource Performance
    - Performance has direct impact on Movement Payments
    - PTS also used to
      - Assess penalties on Regulating & Non-Regulating Units



# Market Based - Rate Schedule 3

## ■ Regulation Service Supplier Settlements

- Resources Scheduled to Provide Regulation Service are eligible for...
  - Regulation Capacity Settlements
- Resources scheduled to Regulate in Real Time are eligible for...
  - Regulation Movement Settlements

# Market Based - Rate Schedule 3

## ■ Regulation Service Recipient Charges

- Regulation Service is assessed to...
  - Internal Load
- Calculated as:

Total Reg. Payments to Resources x LSE Ld Ratio Share

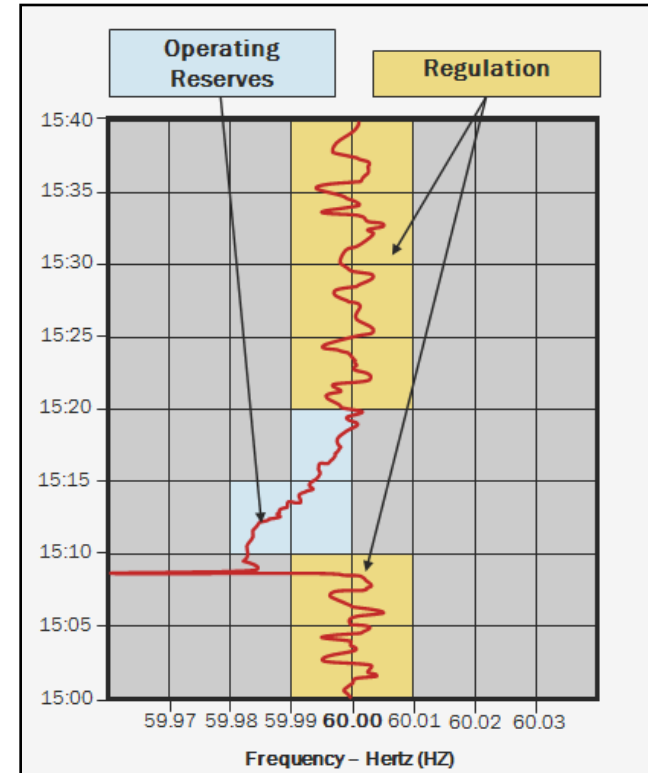
$$\$240 \times 0.25 = \$60$$

# **Market Based – Rate Schedule 5 Operating Reserves**

# Market Based - Rate Schedule 5

## ■ Operating Reserve Service

- Purpose:
  - Backup Generation and/or Demand Response in the Event of a Real Time Power System Contingency
  - In order for the New York Control Area (NYCA) to respond in a timely fashion, the reserves must be available from: Qualified Resources
    - Located within the NYCA and within specific regions



# Market Based - Rate Schedule 5

## ■ Operating Reserve Service

- NYISO procures Operating Reserves using Resources that meet eligibility criteria according to each Operating Reserve product
- Qualified Operating Reserves Resources may include:
  - Generators
  - Demand Side Resources
  - Aggregations
  - Energy Storage Resources (ESRs)

# Market Based - Rate Schedule 5

## ■ Operating Reserve Products

- 10 Minute Spinning Reserve
  - Synchronized to NYS power system
  - Can change output level within 10 minutes
- 10 Minute Non-Synchronized Reserve
  - Can be started, synchronized, & loaded within 10 minutes

# Market Based - Rate Schedule 5

- **Operating Reserve Products**
  - 30 Minute Reserve: Spinning & Non-Synchronized
    - Spinning – Synchronized & can change output level within 30 minutes
    - Non-Synchronized – Can be started, synchronized, & loaded within 30 minutes

# NYCA Operating Reserves

## NYCA (Zone A – K)

A=most severe NYCA Operating Capability Loss (1310 MWs)

10 Min Spinning Reserve	$\frac{1}{2} A=655$ MWs NYSRC Rule
10 Min Total Reserve	A=1310 MWs NYSRC Rule
30 Min Reserve	2xA=2620 MWs NYSRC Rule

## East (Zone F – K)

A=most severe NYCA Operating Capability Loss (1310 MWs)

10 Min Spinning Reserve	$\frac{1}{4} A=330$ MWs NERC, NPCC Rule
10 Min Total Reserve	1200 MWs NYSRC Rule
30 Min Reserve	1200 MWs NERC, NPCC Rule

## SENY (Zone G – K)

10 Min Spinning Reserve	0 MWs
10 Min Total Reserve	0 MWs
30 Min Reserve	1300 MWs NYSRC Rule

## Long Island (Zone K)

10 Min Spinning Reserve	0 MWs
10 Min Total Reserve	120 MW NERC, NPCC Rule
30 Min Reserve	270 – 540 MWs Max limits NYSRC Rule

## NYC (Zone J)

10 Min Spinning Reserve	0 MWs
10 Min Total Reserve	500 MW
30 Min Reserve	1000 MWs

A	WEST
B	GENESE
C	CENTRL
D	NORTH
E	MHK VL
F	CAPITL
G	HUD VL
H	MILLWD
I	DUNWOD
J	N.Y.C.
K	LONGIL



# Market Based - Rate Schedule 5

## ■ Locational Reserve Requirements Posted to NYISO.com

	NYCA	EAST	SENY	NYC	LI
A=most severe NYCA Operating Capability Loss (1310 MWs)	Zone A-K	Zone F-K	Zone G-K	Zone J	Zone K
10 Minute Spinning Reserve	$\frac{1}{2} A = 655 \text{ MWs}$ (I)	$\frac{1}{4} A = 330 \text{ MWs}$ (IV)	0 MWs	0 MWs	0 MWs
10 Minute Total Reserve	$A = 1310 \text{ MWs}$ (II)	1200 MWs (V)	0 MWs	500 MWs (VIII)	$\frac{1}{10} V = 120 \text{ MWs}$ (X)
30 Minute Reserve	$2 A = 2620 \text{ MWs}$ (III)	1200 MWs (VI)	1300 MWs (VII)	1000 MWs (IX)	270-540 MWs (XI)

# Market Based - Rate Schedule 5

- **Operating Reserve Service – Bidding & Scheduling**
  - NYCA Resources bid in DAM to provide Reserves
    - Flexible
  - Criteria considered in Co-Optimization SCUC/RTD
    - Energy Bids
    - Availability Bids
      - Response Rate
      - Upper Operating Limit

# Operating Reserve Bidding

Mock  
Generator Bid Page

Generator Bid

Generator Name:

ESR Beginning Energy Level MWh

Fuel Type:

Burdened Fuel Price (\$/mmmbtu)

Bid Date (mm/dd/yyyy hh:mi)

Num of Hours

Market

Expiration (DAM only) (mm/dd/yyyy hh:mi)

Energy Bid

CSR Injection Limit (MW) <input type="text"/>		CSR Withdrawal Limit (MW) <input type="text"/>		CSR Outage Type <input type="text"/>							
Lower Storage Limit (MWh) <input type="text"/>		Upper Storage Limit (MWh) <input type="text"/>		ESR Energy Management Mode <input type="radio"/> ISO <input type="radio"/> Self		Lower Operating Limit (MW) <input type="text"/>		ESR Outage Type <input type="text"/>			
Upper Operating Limit (MW) <input type="text"/>				Emergency Upper Operating Limit (MW) <input type="text"/>				Minimum Generation (MW) <input type="text"/>		Minimum Generation Cost (\$) <input type="text"/>	
Self Scheduled (MW)				Unit Operations				Host Load (MW) <input type="text"/>		Start-Up Cost (\$) <input type="text"/>	
<div>00 Minute MW <input type="text"/></div> <div>15 Minute MW <input type="text"/></div> <div>30 Minute MW <input type="text"/></div> <div>45 Minute MW <input type="text"/></div>				<div><input type="radio"/> ISO Committed Flex <input type="radio"/> Self Committed Flex</div> <div><input type="radio"/> Self Committed Fixed <input type="radio"/> ISO Committed Fixed</div>							

Bid Curve (Block Format)

MW (Basepoint)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
\$/MW	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
\$/MW (Opportunity Cost)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Ancillary Services

Item	MW's	\$/MW
10 Minute Spinning Reserves	<input type="text"/>	<input type="text"/>
10 Minute Non-Synchronized Reserves	<input type="text"/>	<input type="text"/>
30 Minute Spinning Reserves	<input type="text"/>	<input type="text"/>
30 Minute Non-Synchronized Reserves	<input type="text"/>	<input type="text"/>
Regulation Capacity	<input type="text"/>	<input type="text"/>
Regulation Movement	<input type="text"/>	<input type="text"/>

# Market Based - Rate Schedule 5

- Reserve Service Implementation
  - Reserve Pickup
    - Large Event RPU - Initiated if Load exceeds current energy dispatch opportunities
    - Dispatch-able resources receive new base points w/ 10 min. ramp time
    - Small Event RPU – used to reduce transmission line loading
    - Regulation suspended during RPU

# Market Based - Rate Schedule 5

- Reserve Service Implementation
  - Maximum Generation Pickup
    - Location Basis – invoked to quickly relieve transmission violation
    - Generating units immediately receive new base points (not ramped)
    - Regulation suspended during Max Gen. Pick Up

# Market Based - Rate Schedule 5

## ■ Operating Reserve Supplier Settlements

- Resources Scheduled to Provide Operating Reserves are eligible for...
  - Operating Reserve Settlements
- Resources, with the exception of Demand Side Resources, instructed to convert Reserves to Energy in Real Time are eligible for...
  - Real Time LBMP Energy Settlements

# Market Based - Rate Schedule 5

## ■ Operating Reserve Recipient Charge

- Operating Reserves are assessed to...
  - Internal Load
  - Exports
- Calculated as:

Total Res Payments to Resources \* LSE Ld Ratio Share  
 $\$1000 \times 0.25 = \$250$

# Market Based - Rate Schedule 4

- **Energy Imbalance Service**
  - Internal Energy Imbalances
    - Addresses differences between Supply and Demand within the NYCA
      - Resolved through the RT Market Process
  - External Energy Imbalances
    - Addresses differences in energy exchange (Transactions) between NYCA and Other Control Areas
      - Resolved through the Inadvertent Energy Accounting Process



## True or False:

Regulation Service Providers respond to 5-minute level basepoint signals from the NYISO...

**True**

**False**

## True or False:

When scheduling Operating Reserves, NYISO software considers both product type and locational requirements...

**True**

**False**



**Draw a line from each of the Market-Based Ancillary Services listed to the applicable purpose for that service:**

Operating Reserve  
Service

Energy Imbalance  
Service

Regulation Response  
Service

Account for differences between  
Supply and Demand

Maintain 60Hz Frequency  
by *chasing load*

Backup Generation  
A.K.A *MW Savings Account*

# Summary

## ■ 3 Cost Based Ancillary Services

- Scheduling, System Control, & Dispatch
  - Covers NYISO costs of operations
- Voltage Support Service
  - Necessary to maintain proper force/pressure in the delivery of electrical energy
- Black Start Service
  - Provides system restoration in the event of system-wide black out

## ■ 3 Market Based Ancillary Services

- Regulation and Frequency Response
  - Necessary for the continuous balancing of resources with load
  - Assists in maintaining scheduled Interconnection Frequency at 60 Hz
- Operating Reserves
  - Backup Generation in the Event of a Major Power System Contingency
- Energy Imbalance
  - Process that addresses Internal and External Energy Imbalances in relationship to NYCA




*Quick  
Reference Table*

*\*Excluding CTS-  
NE Transactions*


Ancillary Service	Injections	Non-Physicals (Virtuals, TCCs, & EDRP/SCR)	Internal Loads	Exports	Wheel- Throughs
Rate Schedule 1 (S,SC & D)	✓	✓	✓	✓ *	✓
Rate Schedule 2 (VSS)			✓	✓ *	✓
Black Start Service			✓		
Operating Reserves			✓	✓ *	
Regulation Service			✓		
Energy Imbalance	✓		✓	✓	✓

# Ancillary Services – NYISO Website Information

# Cost Based Ancillary Services Information –Rate Schedule 1 and 2



New York ISO  
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Support

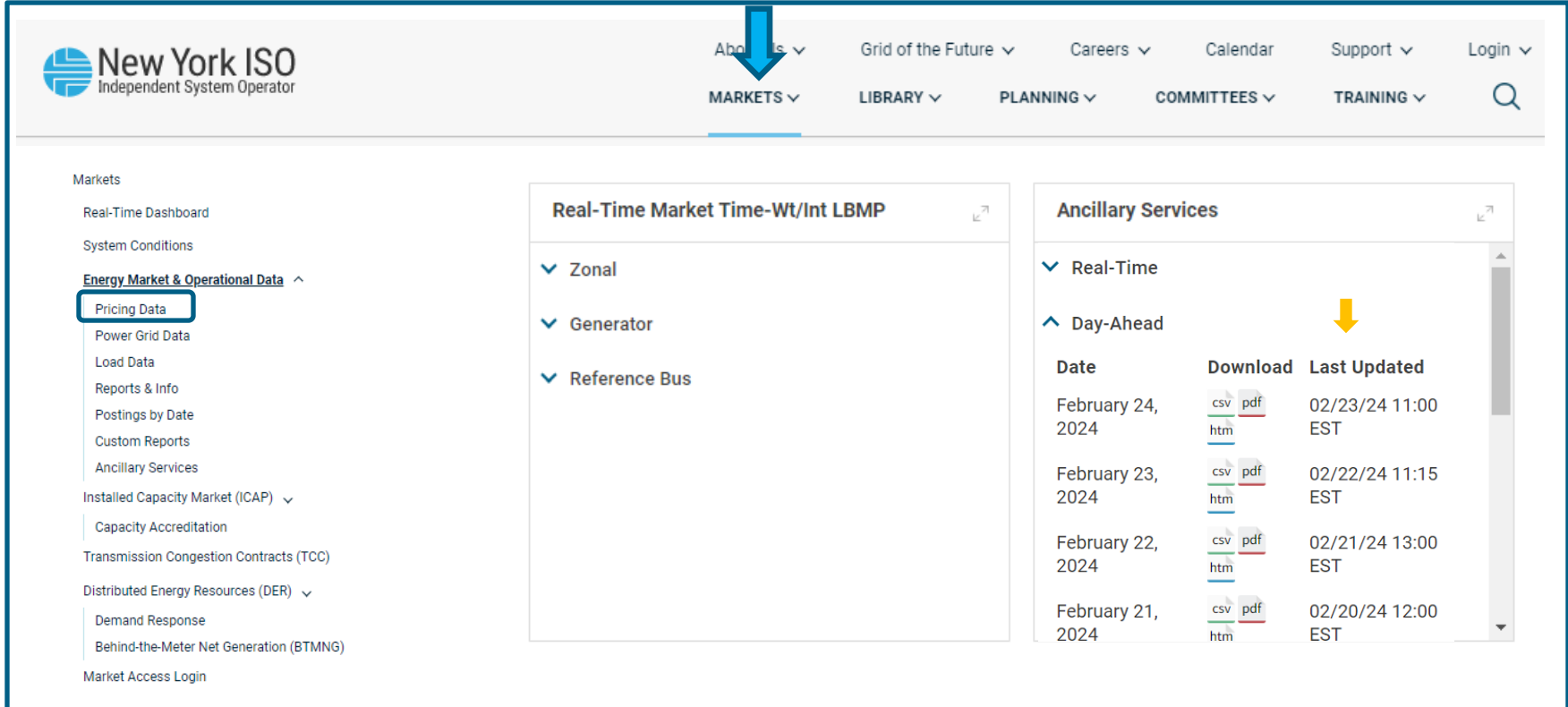
- Budget & Finance
  - Budget & Priorities Working Group
  - Billing & Settlements
    - Billing Rates**
  - NYISO Credit
- Customer Registration
- Knowledge Articles
- Market Monitoring
- Member Community

### Billing Rates

Name	Published	Type
Rate Schedule 1		
2024		
2024 Rate Schedule 1	2023/12/20	pdf
2024 Rate Schedule 1 for Non-Physical Transactions	2023/08/03	pdf
FERC Fees - 2023 - 2024	2023/10/11	pdf
Rate Schedule 2		
2024		
2024 Schedule 2 Rates	2024/01/29	pdf
2023		



# Market Based Ancillary Services – Price Information



The screenshot displays the New York ISO website interface. The top navigation bar includes links for 'About Us', 'Grid of the Future', 'Careers', 'Calendar', 'Support', and 'Login'. Below this, a secondary bar contains 'MARKETS', 'LIBRARY', 'PLANNING', 'COMMITTEES', and 'TRAINING'. A blue arrow points to the 'MARKETS' link. The left sidebar lists various market-related topics, with 'Pricing Data' highlighted by a red box. The main content area is divided into two panels: 'Real-Time Market Time-Wt/Int LBMP' and 'Ancillary Services'. The 'Ancillary Services' panel shows a table with columns for 'Date', 'Download', and 'Last Updated'. A yellow arrow points to the 'Day-Ahead' section of the 'Ancillary Services' panel.

Date	Download	Last Updated
February 24, 2024	<a href="#">csv</a> <a href="#">pdf</a> <a href="#">htm</a>	02/23/24 11:00 EST
February 23, 2024	<a href="#">csv</a> <a href="#">pdf</a> <a href="#">htm</a>	02/22/24 11:15 EST
February 22, 2024	<a href="#">csv</a> <a href="#">pdf</a> <a href="#">htm</a>	02/21/24 13:00 EST
February 21, 2024	<a href="#">csv</a> <a href="#">pdf</a> <a href="#">htm</a>	02/20/24 12:00 EST

# Market Based Ancillary Services, Price Information

Ancillary Services Prices, Day Ahead Market  
02/24/2024

Time Stamp	Time Zone	Name	PTID	10 Minute Spinning Reserve (\$/MWHr)	10 Minute Non-Synchronous Reserve (\$/MWHr)	30 Minute Operating Reserve (\$/MWHr)	NYCA Regulation Capacity (\$/MWHr)
00:00	EST	CAPITL	61757	2.99	2.99	2.99	4.74
00:00	EST	CENTRL	61754	2.99	2.99	2.99	4.74
00:00	EST	DUNWOD	61760	2.99	2.99	2.99	4.74
00:00	EST	GENESE	61753	2.99	2.99	2.99	4.74
00:00	EST	HUD VL	61758	2.99	2.99	2.99	4.74
00:00	EST	LONGIL	61762	2.99	2.99	2.99	4.74
00:00	EST	MHK VL	61756	2.99	2.99	2.99	4.74
00:00	EST	MILLWD	61759	2.99	2.99	2.99	4.74
00:00	EST	N.Y.C.	61761	2.99	2.99	2.99	4.74
00:00	EST	NORTH	61755	2.99	2.99	2.99	4.74
00:00	EST	WEST	61752	2.99	2.99	2.99	4.74

# Additional Resources

- **Tariffs - OATT & MST**
- **Ancillary Services Manual**
- **Accounting & Billing Manual**
- **Technical Bulletins**
- **Miscellaneous Pricing Files**