New York ISO
Independent System Operator

NYISO Ancillary Services

NYISO's six **Ancillary Services** support the transmission of energy from resources to loads, while maintaining reliable operation of the NY State Power System.

How does NYISO coordinate the provision of Ancillary Services?

Selecting Providers → Scheduling Providers → Directing Providers

Some Ancillary Services are provided at Cost-Based Prices

Some Ancillary Services are provided at Market-Based Prices

Ancillary Services at Cost-Based Pricing

- Rate Schedule 1
- Voltage Support Service (VSS)
- Black Start Service Capability

Ancillary Services at Market-Based Pricing

- Regulation & Frequency Response
- Operating Reserves
- Energy Imbalance

Who contributes to cost recovery of Ancillary Services?

Suppliers

Generation Resources and other facilities providing Capacity, Demand Reduction, Energy and/or Ancillary Services to NYISO

Non-Physicals

Participants in: Virtual Trading, Transmission Congestion Contracts, and Demand Response Resources (EDRP/SCR only)

Internal LSEs

Any entity authorized or required by law to supply Energy, Capacity and/or Ancillary Services to retail customers located within the NYCA

Exports

Bilateral Transaction or purchase from the LBMP Market where the Energy is exported to a neighboring Control Area

Wheels-Through

Transmission Service, originating in another Control Area, that is wheeled through the NYCA to another Control Area

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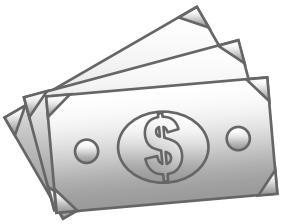
Rate Schedule 1

NYISO's **Ancillary Services** support the transmission of energy from resources to loads, while maintaining reliable operation of the NY State Power System.



What is the purpose of Rate Schedule 1?

- Recovery of NYISO Cost of Operations Associated with:
  - Operation of the NYS Transmission System
  - Administration of the NYISO Tariffs and NYISO Related Agreements

How is Cost Recovery Achieved Through OATT Rate Schedule 1?

NYISO Annual Budget Charge

- NYISO calculates annual cost recovery rate based on its annual budgeted costs divided by its forecasted MWh volume for the same calendar year
  - Rate is then allocated to Physical Suppliers and Transmission Customers based on their participation in physical market activity
- NYISO calculates additional rates for the recovery of costs associated with participation in non-physical market activity, allocating costs to Virtual Traders, TCC Holders, and Reliability-Based DR Providers

FERC Fees

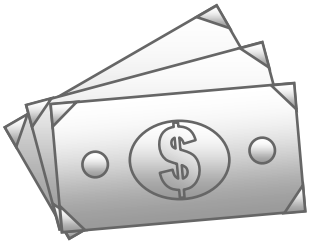
- A charge for the recovery of the annual FERC fee, allocated to both physical market activity and non-physical market activity

Uplift Charges and Residuals

- Uplift charges result from additional payments made above market revenue
- Residual adjustments result from over or under collection from the marketplace
- Both uplift charges and residual adjustments are allocated to NYISO Transmission Customers

Voltage Support Service (VSS)

NYISO's **Ancillary Services** support the transmission of energy from resources to loads, while maintaining reliable operation of the NY State Power System.



What is the purpose of Voltage Support?

- Voltage Support must be provided to support all Transactions on the NYS Transmission System
  - Facilitates sufficient supply of Reactive Power to maintain desired voltage levels on the NYS Transmission System in real time operations

What is Voltage Support Service?

Proper Voltage Support (Force/Pressure) is necessary for delivery of electrical energy; this is measured in **Reactive Power (MVAr).**

- Produced to raise voltage = Lagging (+)
- Absorbed to lower voltage = Leading (-)

VSS Financial Settlements

VSS Supplier Payments:

- NYISO calculates monthly payments for Voltage Support Suppliers based on an annual VSS supplier compensation rate

VSS Cost Allocation:

- NYISO calculates annual VSS cost recovery rate based on budgeted VSS costs divided by NYISO forecasted MWh volume for same calendar year and allocates rate to NYISO Transmission Customers based on participation in physical market activity

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Black Start and System Restoration Services

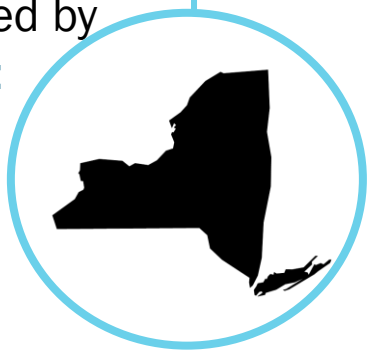
NYISO's **Ancillary Services** support the transmission of energy from resources to loads, while maintaining reliable operation of the NY State Power System.

What is the purpose of Restoration-Services?

- If a partial or system-wide blackout occurs, the NYISO selects generating resources with black start capability to assist in the restoration of the New York Control Area (NYCA)

Resources with Black Start Capability are selected by NYISO according to the following considerations:

- Location in the NYCA
- Startup time
- Response rate
- Maximum power output



Statewide Restoration Service Financial Settlements

Supplier Payments:

- Restoration Services providers receive weekly payments based on their annual costs associated with being Black Start capable

Cost Allocation:

- NYISO allocates a weekly cost recovery charge to internal NYCA LSEs based on the total cost of Restoration Services and internal LSE's share of Load in the NYCA

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Regulation & Frequency Response

NYISO's **Ancillary Services** support the transmission of energy from resources to loads, while maintaining reliable operation of the NY State Power System.

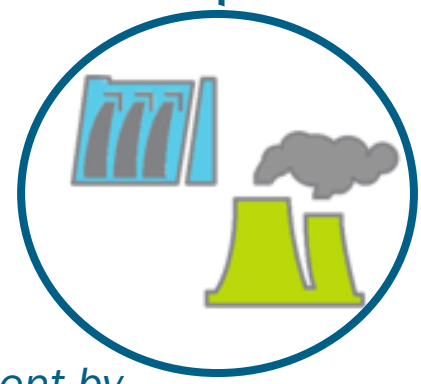
What is the purpose of Regulation & Frequency Response?

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

How is Regulation & Frequency Response achieved?

Regulation is accomplished by dispatching:

- On-line generators
- Energy Storage Resources
- Demand Side Regulation
- Limited Energy Storage Resources



Supplier Output may be ↑ raised or ↓ lowered, known as Regulation Movement, to follow *moment by moment* changes in load

Regulation & Frequency Financial Settlements

Regulation & Frequency Supplier Payments:

- Regulation and Frequency Response Suppliers receive compensation based on their approved Regulation Capacity schedule and any Regulation Movement provided in RT

Regulation & Frequency Cost Allocation:

- NYISO charges NYCA LSEs based on the total NYCA Regulation Service costs and internal LSE's share of Load in the NYCA

Operating Reserve Service

NYISO's **Ancillary Services** support the transmission of energy from resources to loads, while maintaining reliable operation of the NY State Power System.

What is the purpose of Operating Reserve Service?

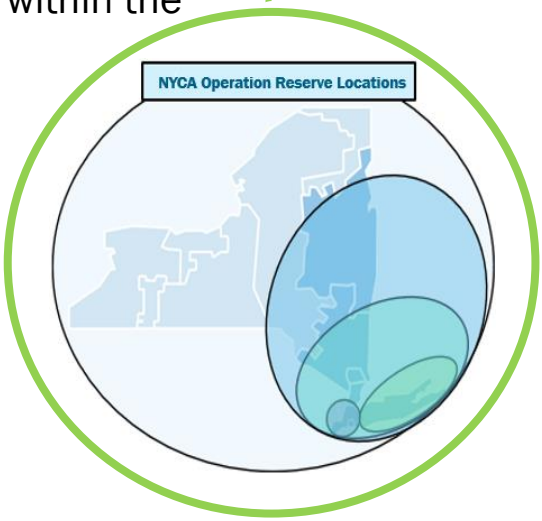
- Backup generation and/or demand response in the event of a major loss of generation or transmission on the NYS Power System in real time

How is Operating Reserve Service achieved?

Operating reserve MWs are procured using generators, Demand side resources, and/or Energy Storage Resources (according to product type and specific regions within the NYCA).

Operating Reserve Service product types:

- **Spinning Reserve** – Power suppliers that are synchronized to the NYS power system; *i.e., Supplying energy in RT*
- **Non-Synchronized Reserve** – Power that can be started and synchronized to the NYS Power System; *i.e., Not supplying energy in RT*



Operating Reserve Financial Settlements

Operating Reserve Supplier Payments:

- Operating Reserve Suppliers receive compensation based on their approved Operating Reserve schedule, along with their product type and grid location

Operating Reserve Cost Allocation:

- NYISO charges Transmission Customers based on the total NYCA Operating Reserve Service costs and Transmission Customer's share of Load in the NYCA

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Energy Imbalance Service

NYISO's **Ancillary Services** support the transmission of energy from resources to loads, while maintaining reliable operation of the NY State Power System.

What is the purpose of Energy Imbalance Service?

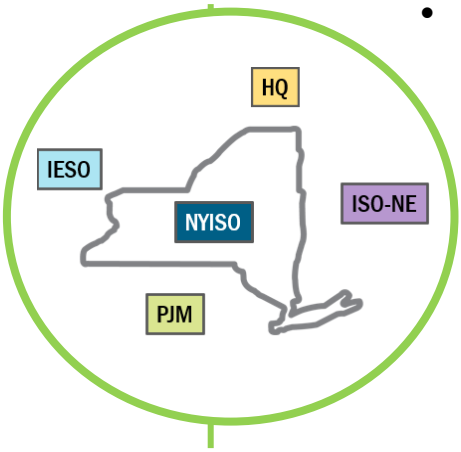
- Addresses differences between supply and demand within the NYCA as well as supply and demand exchanged with neighboring control areas

How is this addressed within the NYCA?

Internal Energy Imbalances

- Addresses differences between Supply and Demand within the NYCA
- Resolved through the Real-Time Market Process by balancing Day-Ahead Market Schedules to Actual Usage

How is this addressed with neighboring control areas?



External Energy Imbalances

- Addresses differences in energy exchange (i.e., Transactions) between NYCA and Neighboring Control Areas)

Resolved through the Inadvertent Energy Accounting Process

- Process identifies discrepancies in scheduled vs. actual MWs interchanged between the NYISO and Neighboring Control Areas resulting in a financial adjustment