New York ISO

NYISO Energy Marketplace

E-Learning Module



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Energy Marketplace

Module Objectives:

- Explain the function and features of the NYISO Energy Market
- Identify the differences between the Day Ahead and Real Time Markets and associated settlements
- Describe the Energy Market Processes including
  - Load Bids and Supply Offers
  - Commitment and Dispatch of Resources
  - Market Timeline

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Market Features and Two Settlement System

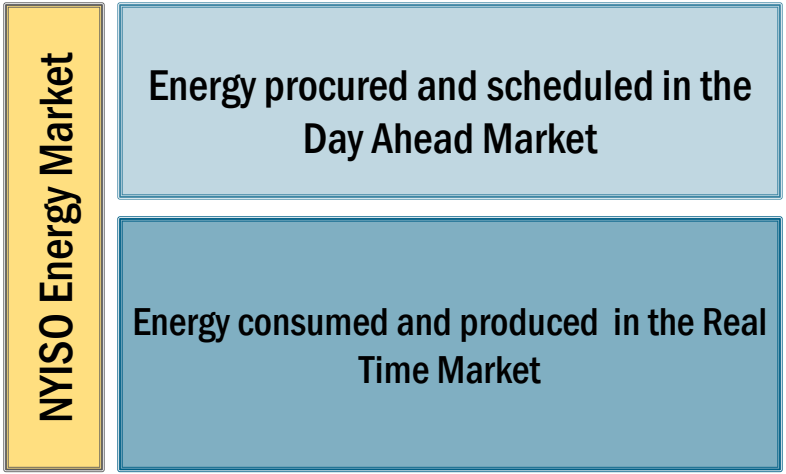
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NYISO's Energy Market

- Function and Features
  - Maintains Reliability Rules while satisfying system constraints
  - Allows for competitive bid-based process
  - Sales and procurement of electrical energy at the wholesale level
  - Provides load and supplier schedules
  - Produces prices for settlement mechanism

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Energy Market: Two Settlement System



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Day Ahead vs. Real Time Market Two Settlement System

- Day Ahead Market
  - Buy and Sell Energy the day prior to actual consumption or production
  - In preparation for actual energy consumption
  - Financially Binding
- Factors that influence the Day Ahead Market:
  - Forecasted Load
  - Load Bids from Load Serving Entities (LSEs)
  - Supply offers from resources
- Benefits:
  - Adequate resources identified to meet forecasted load
  - Price certainty against real time volatility

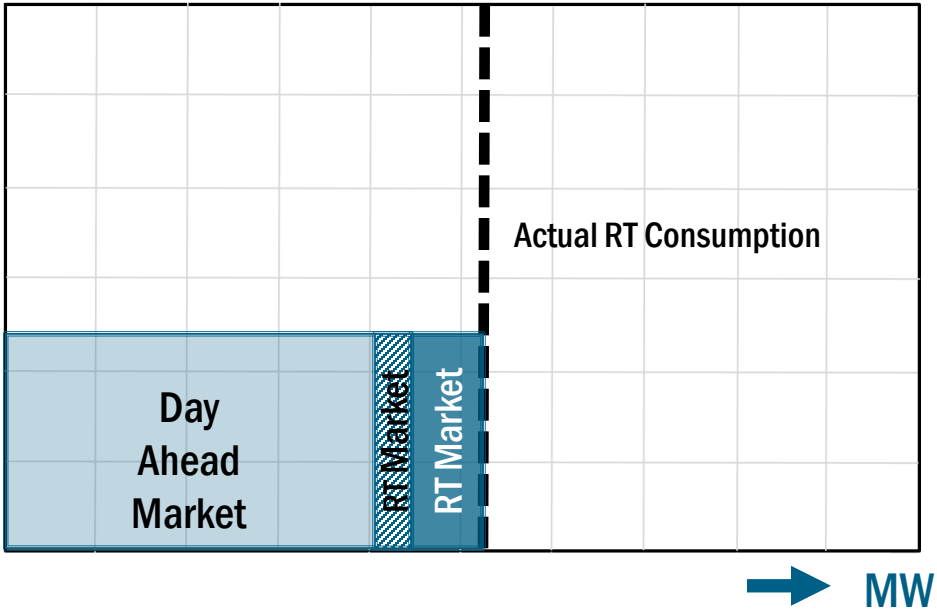
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Day Ahead vs. Real Time Market Two Settlement System

- Real Time Market
  - Buy and Sell the difference during the consumption day
  - Real Time Market Balances DAM Schedule to actual consumption
  - Balancing Market
- Factors that influence Real Time Market:
  - Changes in load
  - Changes in generation availability
  - Neighboring control area system changes
- Benefits:
  - Dispatches resources to meet actual consumption

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Energy Market – Two Settlement System



DAM + RT = Actual Consumption

DAM - RT = Actual Consumption

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Two Settlement System – Example 1

Power Suppliers (for example hour):

Day Ahead Market

DAM MWh	75 MWh
DAM LBMP $/MWh	$50
DAM LBMP Settlement	75 x 50 = $3750

Real Time Market

RT MWh	85 MWh
Balancing MW (RT -DAM)	85-75 = 10 MW
RT LBMP $/MWh	$60
RT LBMP Settlement	10 x 60 = $600

Total Settlement for example hour (DAM$ + RT$) = $4350

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Two Settlement System – Example 2

Power Suppliers (for example hour):

Day Ahead Market

DAM MWh	75 MWh
DAM LBMP $/MWh	$50
DAM LBMP Settlement	75 x 50 = $3750

Real Time Market

RT MWh	65 MWh
Balancing MW (RT - DAM)	65-75 = -10 MW
RT LBMP $/MWh	$60
RT LBMP Settlement	10 x -60 = -$600

Total Settlement for example hour (DAM$ + RT$) = $3150

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Two Settlement System – Example 1

Load Serving Entities (LSEs) (for example hour):

Day Ahead Market

DAM MWh	-25 MWh
DAM LBMP $/MWh	$50
DAM LBMP Settlement	-25 x 50 = -$1250

Real Time Market

RT MWh	-30 MWh
Balancing MW (RT-DAM)	(-30)- (-25) = -5 MW
RT LBMP $/MWh	$60
RT LBMP Settlement	-5 x 60 = -$300

Total Settlement for example hour (DAM$ + RT$) = -$1550

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Two Settlement System – Example 2

Load Serving Entities (LSEs) (for example hour):

Day Ahead Market

DAM MWh	-25 MWh
DAM LBMP $/MWh	$50
DAM LBMP Settlement	-25 x 50 = -$1250

Real Time Market

RT MWh	-20 MWh
Balancing MW (RT-DAM)	(-20)-(-25) = 5 MW
RT LBMP $/MWh	$60
RT LBMP Settlement	5 x 60 = $300

Total Settlement for example hour (DAM$ + RT$) = - $950

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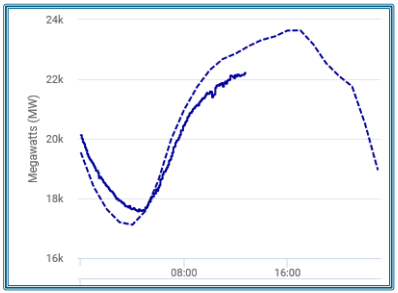
Energy Market Process : Load Forecasting and Bidding

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Load Forecasting

- Two Components:
  - NYISO's Load forecast
  - LSE's Load Forecast
- NYISO's Load Forecast is used for scheduling resources/reliability needs
  - Historical Data
  - Weather
  - TO Forecast Submittals
  - Zonal basis, then summed
- LSE Load Forecast used for initial billing purposes
  - LSEs submit estimated consumption to NYISO

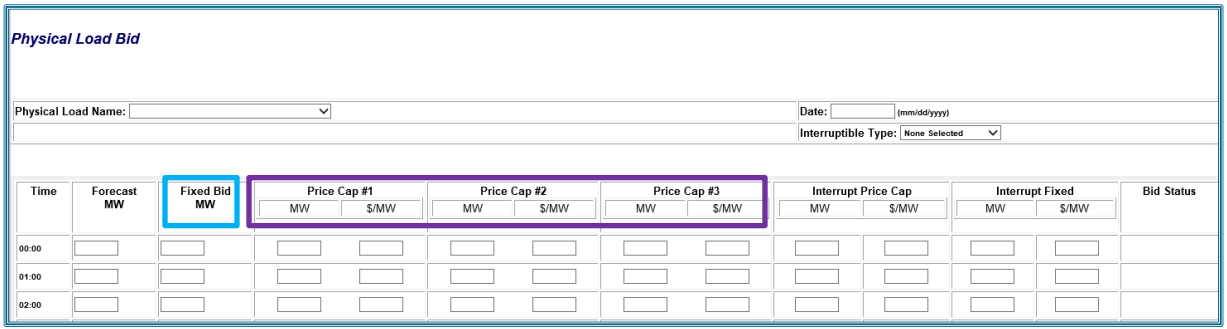
NYISO Load forecast vs. Actual Load



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Load Bidding/Purchasing Options

- LSE can enter bid (in the DAM only) to procure energy from NYISO
  - Fixed Bids
  - Price Capped Load Bids
  - Any accepted bids lock-in a DAM price



Physical Load Bid

Physical Load Name: Date: (mm/dd/yyyy)

Interruptible Type: None Selected

Time	Forecast MW	Fixed Bid MW	Price Cap #1		Price Cap #2		Price Cap #3		Interrupt Price Cap		Interrupt Fixed		Bid Status
			MW	$/MW	MW	$/MW	MW	$/MW	MW	$/MW	MW	$/MW	
00:00													
01:00													
02:00													

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Energy Market Process: Supply Offers and Parameters

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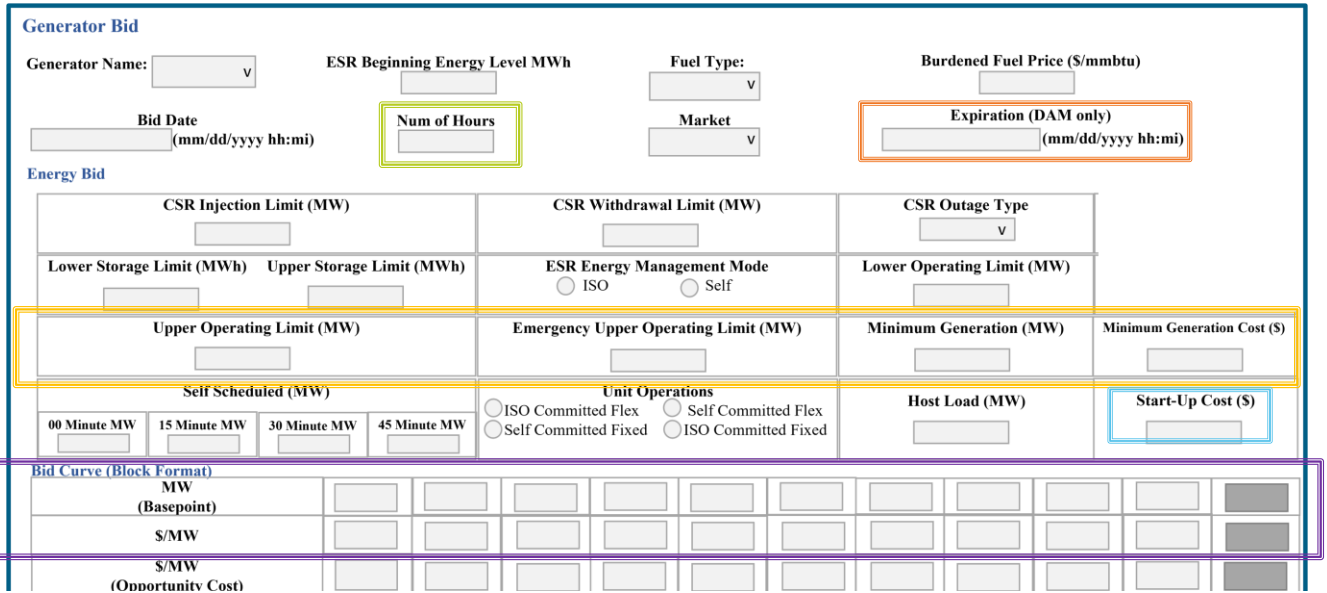
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Submission of Supply Offers

- Suppliers submit offers to sell energy in the DAM or RT Market
- Supply Offer Submissions include:
  - $/MWh Offer
  - Unit Parameters
  - Operating Mode

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Supply Offers: Unit Parameters



Incremental Energy Offer ($/MW)

Duration

Expiration date

Min Gen

Upper Operating Limit

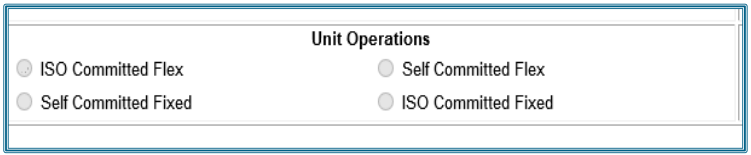
Start-Up Cost

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Supply Offers – Unit Operating Modes

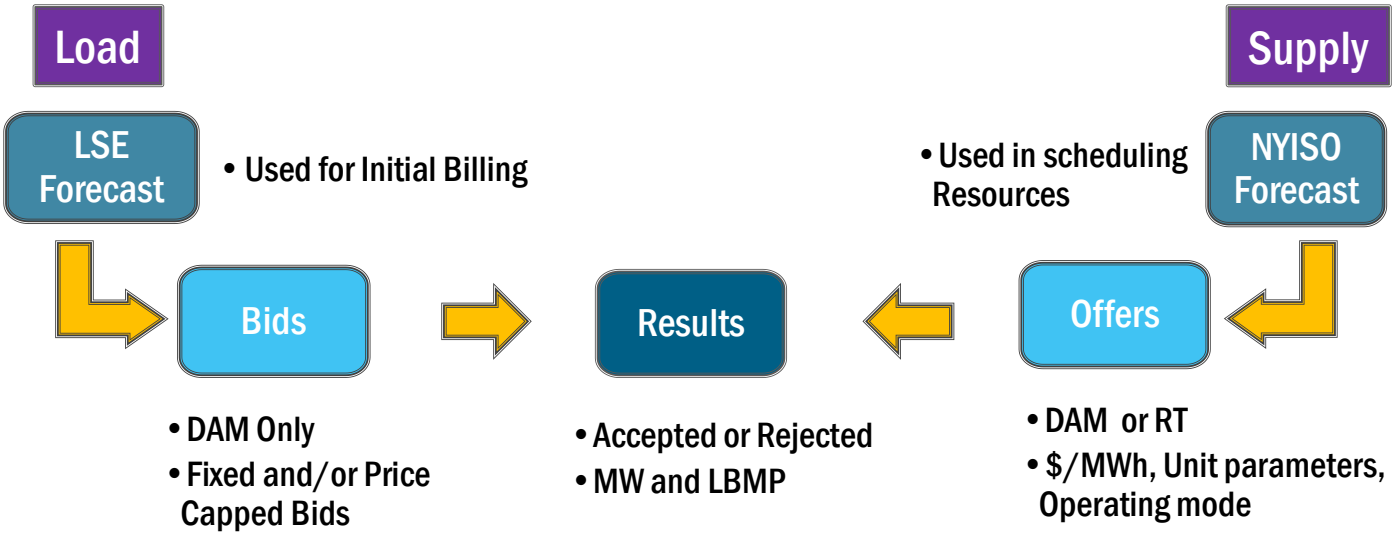
Economics	MWs

• ISO Committed
  • Economically Selected
• Self Committed
  • Price taker
	• Fixed
	  • Fixed output/Operating levels
	  • No changes to in-hour schedule
	• Flexible
	  • Flexible Output
	  • Following NYISO base Point Fluctuation



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Energy Market Process - Summary



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Energy Market Process: Commitment, Dispatch and Market Timelines

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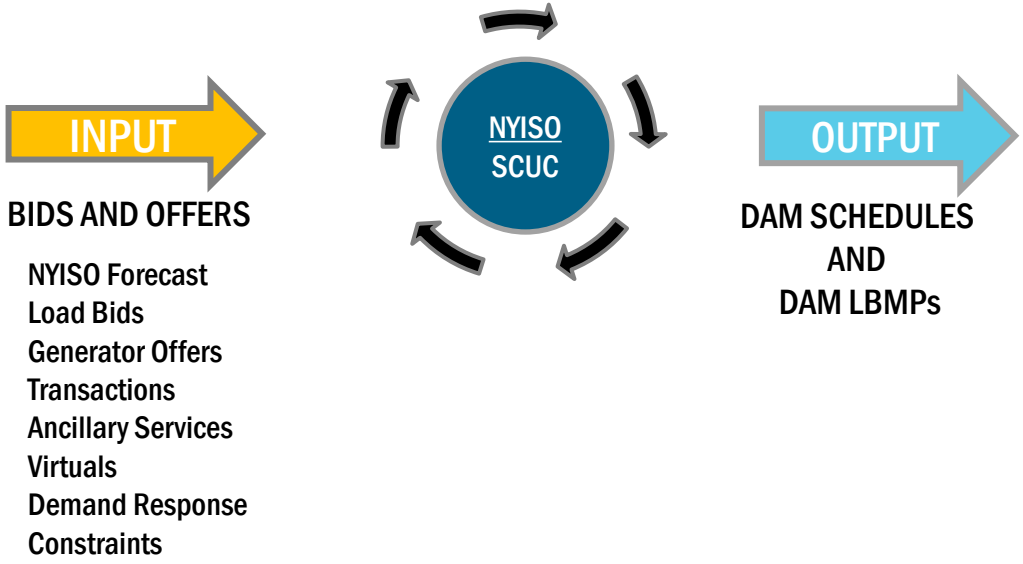
Commitment and Dispatch

- Minimize the as-bid production cost
- Satisfy system constraints and reliability rules
- Time Line
  - Day Ahead Market
  - Real Time Market

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Commitment and Dispatch -DAM

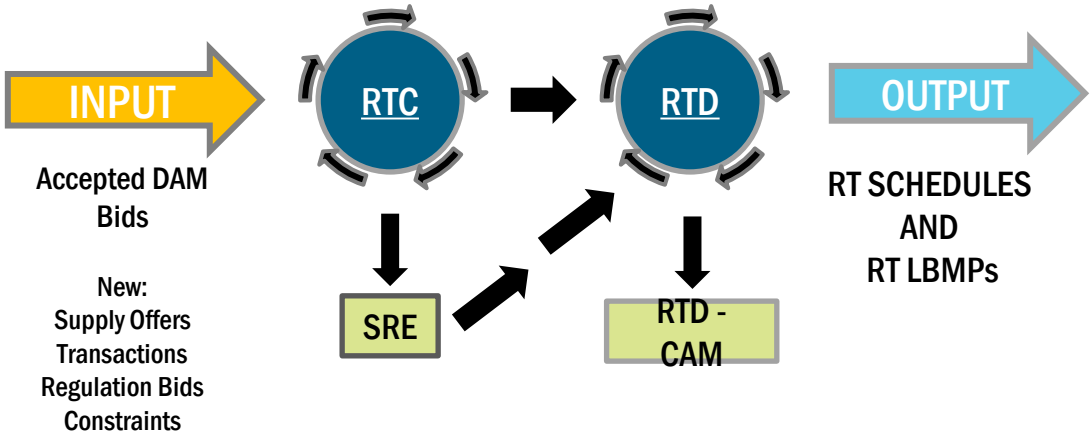
- DAM uses Security Constrained Unit Commitment (SCUC)
  - DAM Schedules
  - DAM LBMP



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Real Time Commitment and Dispatch – RTC and RTD

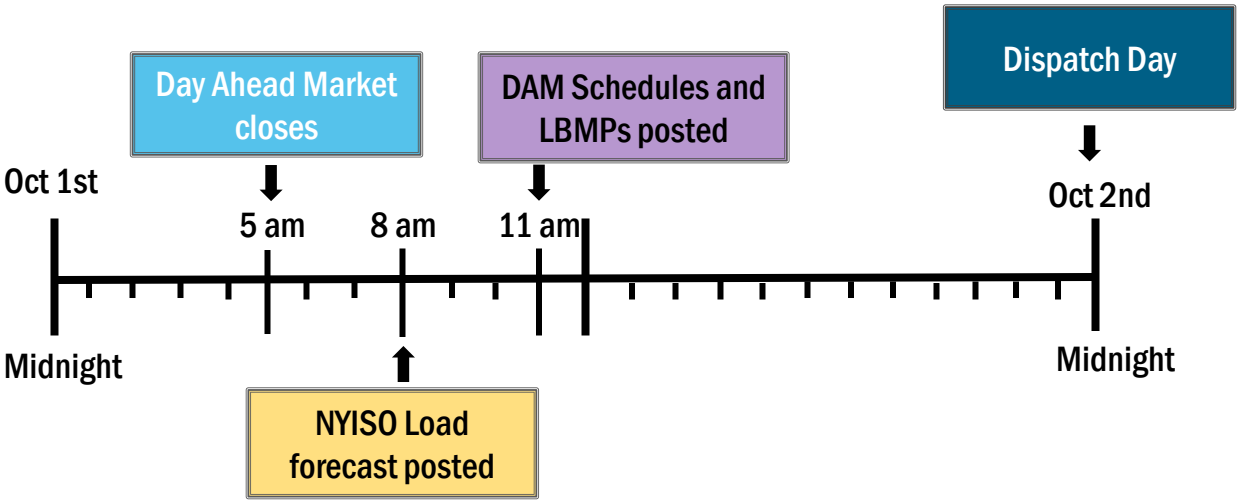
- Includes Supplemental Resource Evaluation (SRE) and RTD Corrective Action Mode (RTD CAM)



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Day Ahead Market - Timeline

One Day before Dispatch Day (Oct. 2nd)

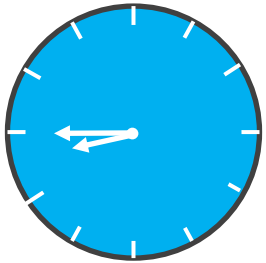


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RT Market -Timeline

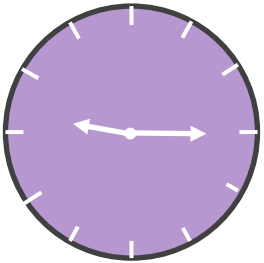
Operating Day – Oct. 2nd HB 10

8:45 AM



RT Bidding Closes
(75 minutes prior to operating hour)

9:15 AM



RT Results Posted
(45 minutes prior to operating hour)

10:00 AM



RTD - Operating Hour
(5 minutes intervals)

NYISO provides advisory commitment information for a 2.5 hour optimization period

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Energy Marketplace Summary

- Energy Market function and features
- DAM vs. RT Market and the Two Settlement System
- Market Process
  - Submission of bids/offers
  - Commitment and Dispatch of Resources
  - Market time line

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Additional Resources

- Tariffs: MST and OATT
- Day Ahead Scheduling Manual
- Transmission and Dispatching Operations Manual
- Market Participant User's Guide

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Questions?

For any future assistance, please contact NYISO Stakeholder Services at stakeholder_services@nyiso.com or by phone at (518) 356-6060

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