



Regulation Market

PJM Initial Training Program

Student Guide

Prepared by:
State & Member Training
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Objectives

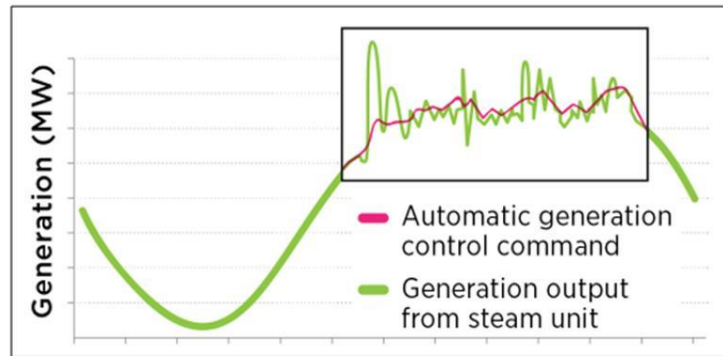
- Define performance based regulation
- Identify regulation resource eligibility criteria
- Explain the different types of regulation
- Identify the role regulation has in PJM Markets
- Identify Regulation Market changes occurring October 1, 2025

Regulation

Regulation

Regulation helps match generation and demand to keep grid functioning normally by ...

- Maintaining system frequency of 60 Hertz
- Tracking moment-to-moment fluctuations in customer electricity use
- Correcting for unintended fluctuations in generation (such as a large generating unit disconnecting from the system)
- Managing differences between forecasted or scheduled power flow and actual power flow on system



The image above illustrates the fluctuations in energy use that can happen in a matter of seconds. Regulation helps stabilize the system instantaneously to balance this supply and demand mismatch.

Balancing Generation & Load

Balancing Generation & Load

Over-Generation: Balanced by Regulation



Over-Generation

- Total Generation > Total Demand
- Frequency > 60 Hertz
- Generators momentarily speed up

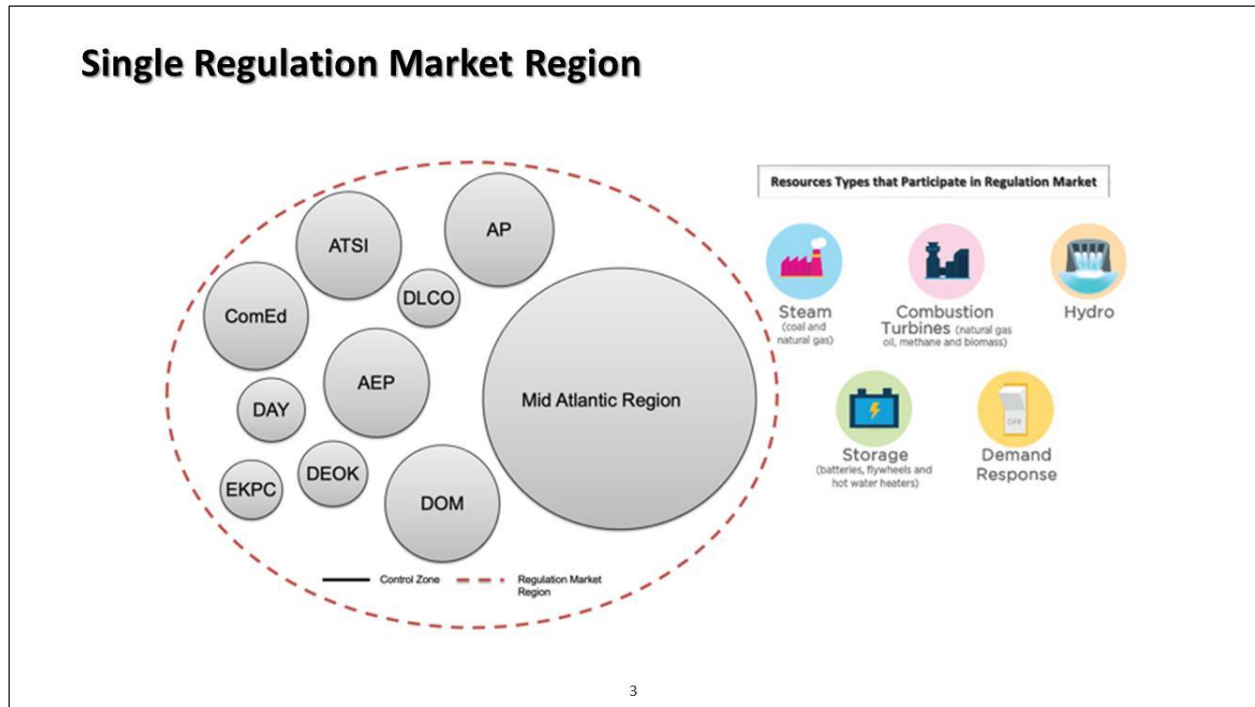
Under-Generation: Balanced by Regulation



Under-Generation

- Total Generation < Total Demand
- Frequency < 60 Hertz
- Generators momentarily slow down

Single Regulation Market Region



Characteristic Differences Between Resources

Characteristic Differences Between Resources

- **Ramp-Limited Resources (RegA)**

- Examples include Steam, Combustion Turbine (CT), Combined Cycle (CC), Hydroelectric Dams
- Fuel-burning results in hours of operation at all deployment levels (sustain full raise/lower)
- Energy output rate-of-change limited by mechanical processes
- Operates on Traditional Regulation Signal

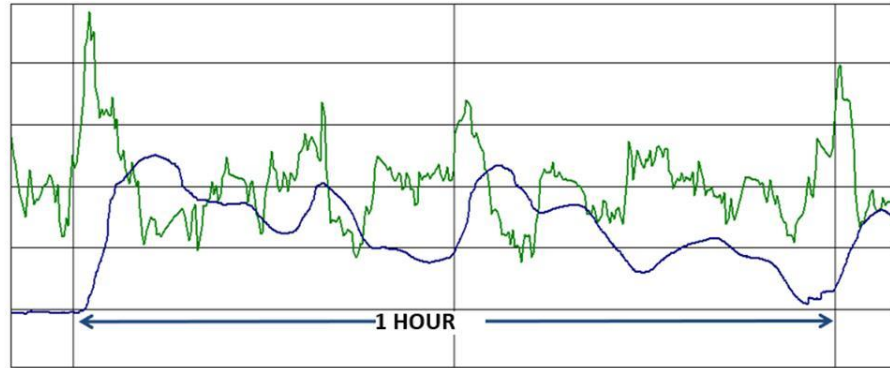
- **Energy-Limited Resources (RegD)**

- Examples include Batteries and Flywheels
- Sub-second matching of control signal (infinite ramp rate)
- Energy output determined by state of charge, storage capacity
- Operates on Dynamic Regulation Signal

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Regulation Signals

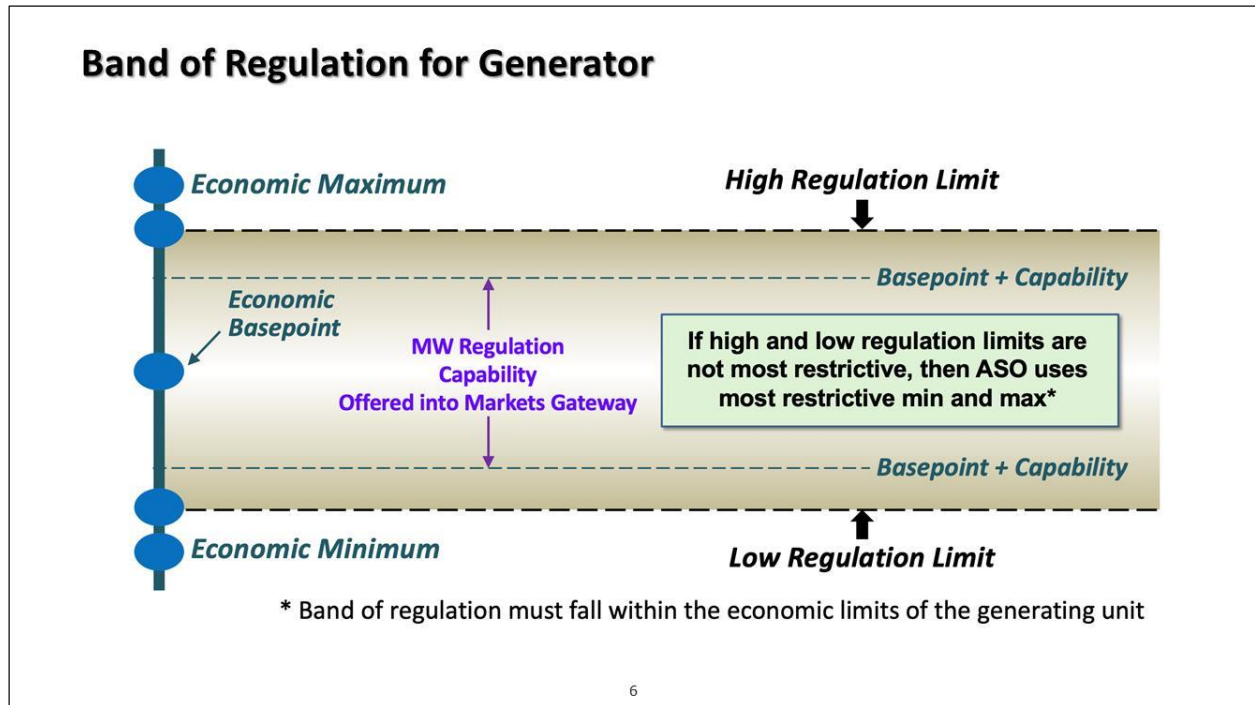
Regulation Signals



RegA (blue) – fleet level regulation signal sent by PJM to ramp-limited resources

RegD (green) – fleet level regulation signal sent by PJM to fast moving units

Band of Regulation for Generator



Regulation Requirement

Regulation Requirement

Season	Dates	Non-Ramp Hours	Ramp Hours	Effective MW Requirement
Winter	Dec 1 – Feb 29	HE1 – HE4, HE10 – HE16	HE5 – HE9, HE17 – HE24	Non-Ramp = 525MW Ramp = 800MW
Spring	Mar 1 – May 31	HE1 – HE5, HE9 – HE17	HE6 – HE8, HE18 – HE24	Non-Ramp = 525MW Ramp = 800MW
Summer	Jun 1 – Aug 31	HE1 – HE5, HE15 – HE18	HE6 – HE14, HE19 – HE24	Non-Ramp = 525MW Ramp = 800MW
Fall	Sep 1 – Nov 30	HE1 – HE5, HE9 – HE17	HE6 – HE8, HE18 – HE24	Non-Ramp = 525MW Ramp = 800MW

Market-Based Regulation

Market-Based Regulation

- Creates market for regulation
- Provides Market Clearing Prices for regulation
- Protects supplier by providing opportunity cost of energy
- Provides more incentive to provide regulation
- LSE Obligation
- Hourly Regulation obligations are determined after-the-fact, based on LSE's total real time hourly load
- LSEs can estimate their share of PJM Regulation Requirement in advance by comparing their hourly load forecast to PJM hourly load forecasts provided by PJM
- **LSEs can meet their obligation to provide regulation to grid by ...**
 - Self-scheduling own generation
 - Purchasing required regulation under contract with another party
 - Purchasing from PJM Regulation Market

Fulfilling Obligation: Bilateral Transactions

Fulfilling Obligation: Bilateral Transactions

- Entered by Buyer using Markets Gateway
 - Entered as a MW amount to be transacted
- Confirmed by Seller in Markets Gateway
- Data entered and confirmed no later than 13:30 the day after the transaction starts
 - Transaction that have been reported and confirmed may not be changed; they must be deleted and re-reported
 - Deletion of a reported transaction after its start time has passed will result in a change in the end time to the current hour
 - Confirmation after 13:30 will default the transaction to starting the day of confirmation

Regulation Bilaterals

Regulation Bilaterals

pjm | Markets Gateway

Bilaterals

- Demand
- Demand Response
- Generator
- Interface Pricing
- Opportunity Cost Calculator
- Parameter Limits
- Price Responsive Demand
- Pseudo Tie Transaction
- Public
- System Utilities
- Up-To-Transaction
- Virtual
- Weather Forecast

Date: September 2023

Regulation Bilaterals
Synchronized Reserve Bilaterals
Non-Synchronized Reserve Bilaterals
Secondary Reserve Bilaterals

	Confirmation	Confirmation Time	ID	Buyer	Seller
<input checked="" type="checkbox"/>	No			BDLLC	ABENE

Refresh

Save

HW	Start Time	Stop Time
9	8/11/2023 11	8/11/2023 13

10

Note: The Bilaterals page uses Hour Beginning instead of Hour Ending like other pages in Markets Gateway.

Regulation Awards

Regulation Awards

DA Energy Award

Regulation Award

DA Synchronized Reserve Award

RT Synchronized Reserve Award

DA Non-Synchronized Reserve Award

DA Secondary Reserve Award

RT Secondary Reserve Award

BDLLC >> 2025-05-28 >> BDLLC

Hour	Location	Reg A Offer MW	Reg D Offer MW	Self-Schedule MW	Reg A Awarded MW	Reg D Awarded MW	TPS Result	Reg Price Offer Used	Performance Score
Show all	Show All	Show all	Show all	Show all	Show all	Show all	Show all	Show all	Show all
1	BDLLC Hydra 34 Hydro	0.0	0.0	0.0	0.0	0.0		0.00	
1	BDLLC Lock 1 Steam	0.0	0.0	0.0	0.0	0.0		0.00	
1	BDLLC Lock 2 Steam	0.0	0.0	0.0	0.0	0.0		0.00	
1	BDLLC Russet 1 Steam	0.0	0.0	0.0	0.0	0.0		0.00	
1	BDLLC Yacnee 10 Steam	0.0	0.0	0.0	0.0	0.0		0.00	
1	BDLLC Yacnee 20 Steam	0.0	0.0	0.0	0.0	0.0		0.00	
1	BDLLC Yacnee 30 Steam	0.0	0.0	0.0	0.0	0.0		0.00	
2	BDLLC AMMERBAC 10 Steam	0.0	0.0	0.0	0.0	0.0		0.00	
2	BDLLC AMMERBAC 20 Steam	0.0	0.0	0.0	0.0	0.0		0.00	
2	BDLLC AMMERBAC 30 Diesel	0.0	0.0	0.0	0.0	0.0		0.00	
2	BDLLC Caprice 31 Hydro	0.0	0.0	0.0	0.0	0.0		0.00	
2	BDLLC Haida 1 Steam	0.0	0.0	0.0	0.0	0.0		0.00	
2	BDLLC Hydra 34 Hydro	0.0	0.0	0.0	0.0	0.0		0.00	
2	BDLLC Lock 1 Steam	0.0	0.0	0.0	0.0	0.0		0.00	
2	BDLLC Lock 2 Steam	0.0	0.0	0.0	0.0	0.0		0.00	
2	BDLLC Russet 1 Steam	0.0	0.0	0.0	0.0	0.0		0.00	
2	BDLLC Yacnee 10 Steam	0.0	0.0	0.0	0.0	0.0		0.00	

Regulation Offer Parameters

Regulation Offer Parameters



- **Reg Type** - Reg A or Reg D
- **Offer MW** - amount of regulation MW offered
- **Price Offer** - Cannot be more than \$100/MW total
 - **Capability Offer Price** - resource owner's price to reserve MWs for regulation in \$/MW
 - **Performance Offer Price** - \$/ΔMW price to provide regulation movement. The \$/MW value determined in this step is converted to \$/ΔMW by dividing the value by mileage ΔMW/MW for the applicable signal for that offer.
- **Capability Offer Cost** - cost to reserve MW in \$/MW
 - Must be ≤ fuel cost increase and heat rate degradation due to operating at lower loads + optional \$12/MWh adder
- **Performance Offer Cost** - \$/ΔMW cost increase due to Heat Rate increase during non-steady state operation and Cost increase in VOM.
 - Regulation Cost Validation Spreadsheet
 - <http://www.pjm.com/markets-and-operations/ancillary-services>
- **Variable Operating and Maintenance (VOM) Rate** - Increase resulting from operating resource at higher heat rate than is otherwise economic

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- PJM Ancillary Services: <http://www.pjm.com/markets-and-operations/ancillary-services>

Regulation Cost-Based Offers

Regulation Cost-Based Offers

- **Heat Rate @ Eco Max [BTU/kWh]**
 - Default economic maximum shown on both Daily Regulation Offers and Unit Detail pages
 - Optional parameter to support the cost-based regulation offer price
- **Heat Rate @ Reg Min [BTU/kWh]**
 - Default regulation minimum shown on both Daily Regulation Offers and Unit Detail pages
 - Optional parameter to support the cost-based regulation offer price

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Regulation Cost-Based Offers

- **Variable Operating and Maintenance (VOM) Rate [\$/MWh of Regulation]** - Increase in VOM resulting from operating at a higher heat rate than is otherwise economic
- **Fuel Cost [\$/MBTU]** - The fixed fuel costs of the resource
 - Value used to determine the heat rate adjustments during steady-state and non steady-state operation
 - Optional parameter to support the cost-based regulation offer price
- **Energy Storage Loss [\$/MWh of Regulation]** - The value is used to account for the energy losses experienced by an energy storage device while providing regulation service
 - This field is valid only for energy storage resources

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Generator > Regulation Market > Offers

Generator > Regulation Market > Offers

Offers										
Updates										
Regulation & Updates										
Regulation D Updates										
BDLLC >> 2023-09-29 >> BDLLC										
Location	Area	Type	Offer MW	Capability Offer Price	Performance Offer Price	Capability Offer Cost	Performance Offer Cost	Econ. Max. Heat Rate	Reg. Min. Heat Rate	
<input type="checkbox"/> BDLLC AMWERBAC 10 Steam	RTO	A	25.0	13.71	0.91	12.46	0.83	8758	9065	
<input type="checkbox"/> BDLLC AMWERBAC 20 Steam	RTO	A	25.0	14.14	0.84	12.85	0.76	9627	10200	
<input type="checkbox"/> BDLLC Caprice 31 Hydro	RTO	A	2.0	12.00	1.75	12.00	0.00			
<input type="checkbox"/> BDLLC Lock 1 Steam	RTO	A	25.0	14.42	0.87	13.11	0.79	9235	9950	
<input type="checkbox"/> BDLLC Lock 2 Steam	RTO	A	25.0	13.96	0.89	12.69	0.81	9621	9950	
<input type="checkbox"/> BDLLC Russet 1 Steam	RTO	A	5.0	56.29	0.89	51.17	0.81	11287	13090	
<input type="checkbox"/> BDLLC Yacnee 10 Steam	RTO	A	15.0	14.07	1.13	12.79	1.03	9967	10200	
<input type="checkbox"/> BDLLC Yacnee 20 Steam	RTO	A	15.0	14.09	1.17	12.81	1.06	9927	10200	
<input type="checkbox"/> BDLLC Yacnee 30 Steam	RTO	A	30.0	13.89	0.96	12.63	0.87	9013	9320	

Variable Operating & Maintenance Expense Rate	Fuel Cost	Energy Storage Loss	Econ. Max. MW	Reg. Min. MW	Min. Offer MW	Availability	Self Scheduled	Rolling Average Performance Score
3.67	2.38		850.0	500.0	5.0	Available	-	
3.18	2.31		850.0	500.0	2.0	Available	-	
10			0.0	4.0	0.1	Available	-	
3.32	2.41		850.0		3.0	Available	-	
3.43	2.31		850.0	500.0	5.0	Available	-	
3.71	2.41		150.0	106.0	1.0	Available	-	
4.41	2.31		620.0	320.0	4.0	Available	-	
4.59	2.34		614.0	320.0	3.0	Available	-	
4.32	2.33		650.0	300.0	5.0	Available	-	

Generator > Regulation Market > Updates

Generator > Regulation Market > Updates

Generator
Unit
Schedules
Dispatch Lambda
Market Results
Regulation Market
Synchronized Reserve M
Non-Synchronized Reserv
Secondary Reserve Mark
Unit Limitations
Interface Pricing
Opportunity Cost Calculator
Parameter Limits
Price Responsive Demand
Pseudo Tie Transaction
Public
System Utilities
Up-To-Transaction
Virtual
Weather Forecast

Offers Updates Regulation A Updates Regulation D Updates

BDLLC >> 2025-06-25 >> BDLLC AMMERBAC 10 Steam (20335110)
Reg. Min. MW : 330.0 Reg. Max. MW : 850.0 Reduced Ramp Rate (%) : 0.0

<input type="checkbox"/>	Hour	Reg. Min. MW	Reg. Max. MW	Spilling	Reduced Ramp Rate (%)	Min. Offer MW
<input type="checkbox"/>	1			-	0	
<input type="checkbox"/>	2			-	0	
<input type="checkbox"/>	3			-	0	
<input type="checkbox"/>	4			-	0	
<input type="checkbox"/>	5			-	0	
<input type="checkbox"/>	6			-	0	
<input type="checkbox"/>	7			-	0	
<input type="checkbox"/>	8			-	0	
<input type="checkbox"/>	9			-	0	
<input type="checkbox"/>	10			-	0	
<input type="checkbox"/>	11			-	0	
<input type="checkbox"/>	12			-	0	

Generator > Regulation Market > Regulation A/D Updates

Generator > Regulation Market > Regulation A/D Updates

- Bilaterals
- Demand
- Demand Response
- Generator
 - Unit
 - Schedules
 - Dispatch Lambda
 - Market Results
 - Regulation Market
 - Synchronized Reserve Ma
 - Non-Synchronized Reserv
 - Secondary Reserve Marke
 - Unit Limitations
 - Interface Pricing
 - Opportunity Cost Calculator
 - Parameter Limits
 - Price Responsive Demand
 - Pseudo Tie Transaction
 - Public
 - System Utilities
 - Up-To-Transaction
 - Virtual
 - Weather Forecast

Portfolio: BOLLIC Location: BOLLIC AMHERBAC 10 Steam

Offers Updates Regulation A Updates Regulation D Updates

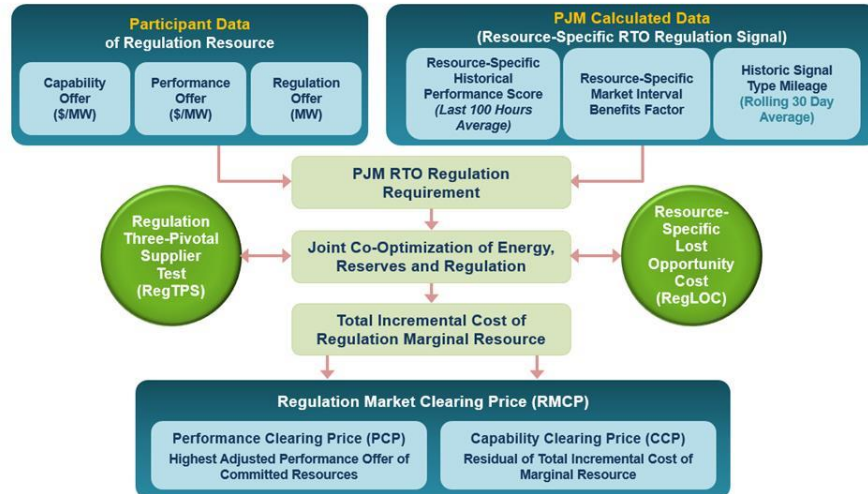
BOLLIC >> 2023-09-29 >> BOLLIC AMHERBAC 10 Steam (20335110)

Reg. A MW : 25.0 Commit Status : Available

Hour	Reg. A MW	Reg. A Self Scheduled	Reg. A Commit Status	Reg. A Capability Offer Price	Reg. A Performance Offer Price	Reg. A Capability Offer Cost	Reg. A Performance Offer Cost
<input type="checkbox"/> 1		-	Available				
<input type="checkbox"/> 2		-	Available				
<input type="checkbox"/> 3		-	Available				
<input type="checkbox"/> 4		-	Available				
<input type="checkbox"/> 5		-	Available				
<input type="checkbox"/> 6		-	Available				
<input type="checkbox"/> 7		-	Available				
<input type="checkbox"/> 8		-	Available				
<input type="checkbox"/> 9		-	Available				
<input type="checkbox"/> 10		-	Available				
<input type="checkbox"/> 11		-	Available				
<input type="checkbox"/> 12		-	Available				
<input type="checkbox"/> 13		-	Available				

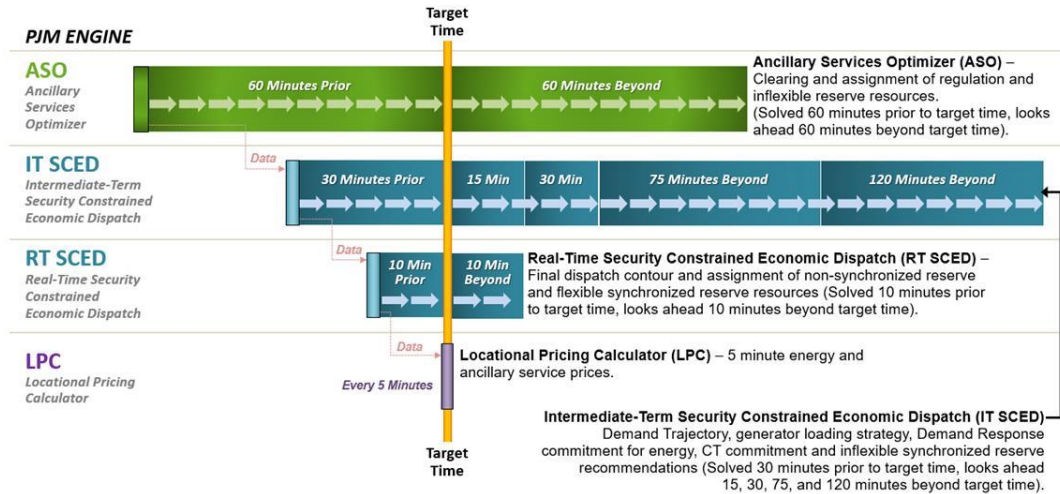
Regulation Market Clearing Process

Regulation Market Clearing Process



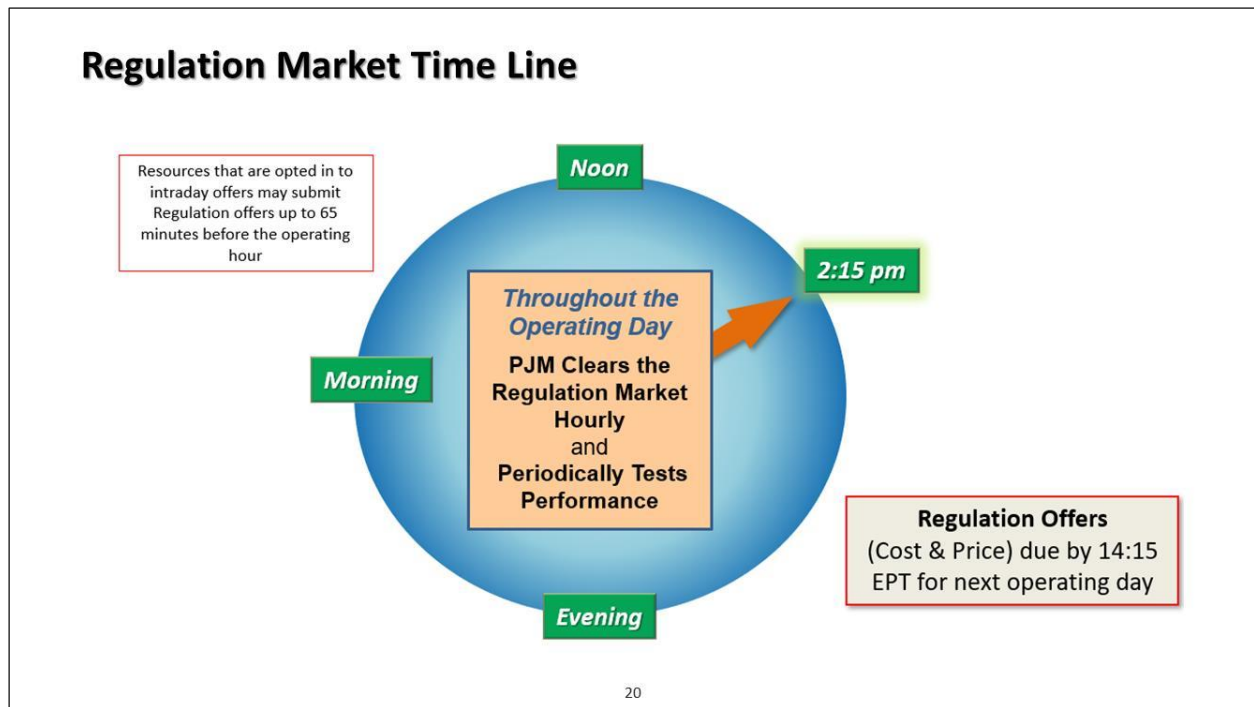
Market Clearing, Dispatching and Pricing Engines

Market Clearing, Dispatching and Pricing Engines

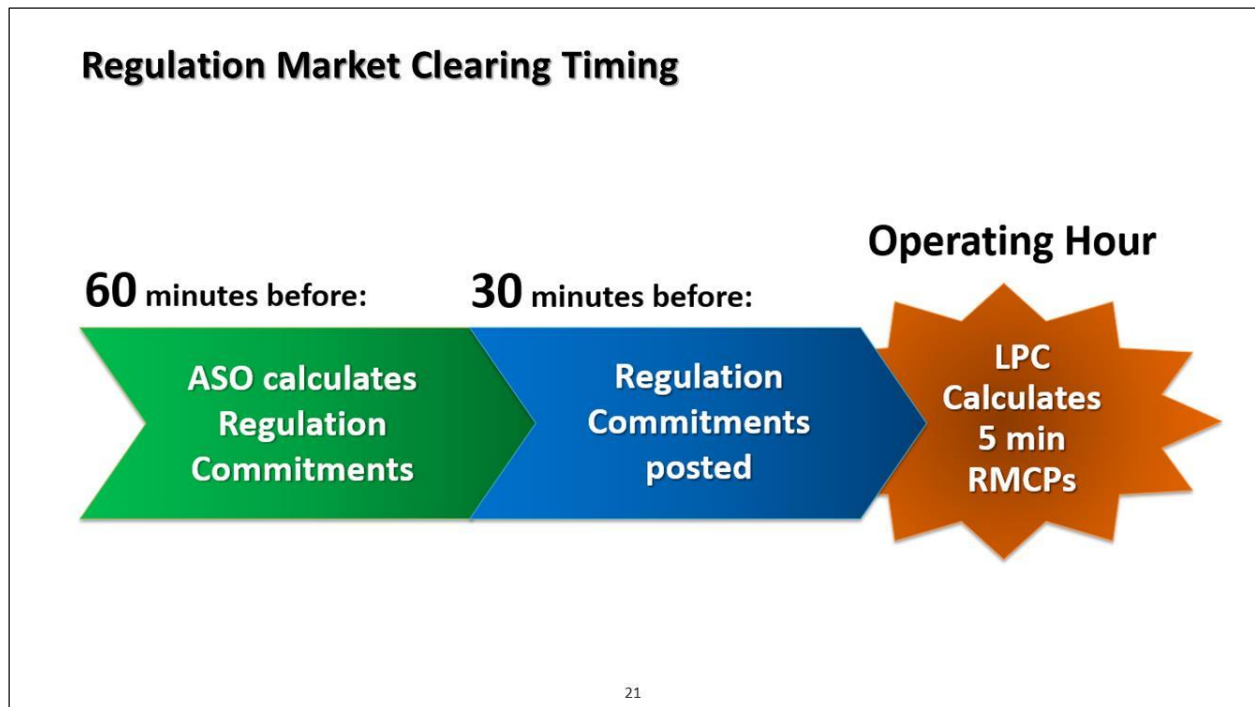


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Regulation Market Time Line



Regulation Market Clearing Timing



DA Energy Award												Regulation Award	DA Synchronized Reserve Award	Synchronized Reserve Award	DA Non-Synchronized Reserve Award	DA Secondary Reserve Award	BT Secondary Reserve Award		
BOLLC ** 2025-06-25 ** BOLLC																			
Hour	Location	Reg A Offer MW	Reg D Offer MW	Self-Schedule MW	Reg A Awarded MW	Reg D Awarded MW	TPS Result	Reg Price Offer Used	Performance Score										
Show all	Show All	Show all	Show all	Show all	Show all	Show all	Show all	Show all	Show all										
1	BOLLC ANHEERAC 10 Stream	0.0	0.0	0.0	0.0	0.0	0.0	0.00											
1	BOLLC ANHEERAC 20 Stream				0.0	0.0	0.0	0.00											
1	RPA LT ANHEERAC 10th Parcel	N/A	N/A	N/A				N/A											
Regulation Prices																			
Datetime Beginning EPT		Start Date		5/5/2025		10:30		End Date		6/25/2025		10:35		Submit		Reset		Export:	
Datetime Beginning UTC	Datetime Beginning EPT	Area	Regulation Quantity MW	Regulation Requirement MW	Market Clearing Price	Market Capex Clearing Price	Capacity Clearing Price	Performance Clearing Price	Marginal Benefits Factor										
6/25/2025 14:30	6/25/2025 10:30	PJM_RTO	801.2	800	75.67	75.67	74.2	1.497	1.06										
6/25/2025 14:35	6/25/2025 10:35	PJM_RTO	801.2	800	75.74	75.74	74.85	1.497	1.06										
6/25/2025 14:40	6/25/2025 10:40	PJM_RTO	801.2	800	38.87	38.87	38.87	0.02	1.06										
6/25/2025 14:45	6/25/2025 10:45	PJM_RTO	801.2	800	38.73	38.73	38.58	0.15	1.06										
6/25/2025 14:50	6/25/2025 10:50	PJM_RTO	801.2	800	120.02	120.02	120.02	0.1	1.06										
6/25/2025 14:55	6/25/2025 10:55	PJM_RTO	771.5	800	40.81	40.81	40.51	1.03	1.03										
6/25/2025 15:00	6/25/2025 11:00	PJM_RTO	771.5	800	47.32	47.32	47.17	1.03	1.03										
6/25/2025 15:05	6/25/2025 11:05	PJM_RTO	799.2	800	194.03	194.03	196.28	0.94	0.94										
6/25/2025 15:10	6/25/2025 11:10	PJM_RTO	799.2	800	171.09	171.09	169.9	0.94	0.94										
6/25/2025 15:45	6/25/2025 11:45	PJM_RTO	799.2	800	179.33	179.33	179.2	0.94	0.94										

What	Frequency	Location	When
Assignment	Hourly	Markets Gateway	30 min prior to top of the hour
Clearing Price	5 Minutes	Data Miner	Every 5 minutes

Private Generator Results under:
Generator >> Market Results >> Regulation and Reserve Award

Performance Scores

Performance Scores

A ***performance score*** is calculated for each regulation resource for each regulating hour.

- Performance scores reflect the benefits each resource provides to system control by focusing on the resource's response to PJM control signals
- PJM will provide continuous feedback to the regulation resources of their performance using near real time reporting for each resource through Markets Gateway.
- Data posting for each resource through Markets Gateway

Regulation Adjusted Offers

Regulation Adjusted Offers

Adjusted Regulation Capability Cost (\$)

$$\left(\frac{\text{Capability Offer} \left(\frac{\$}{\text{MW}} \right)}{\text{Benefits Factor of Offered Resource}} \right) * \left(\frac{\text{Capability (MW)}}{\text{Historic Performance Score}} \right)$$

Adjusted Lost Opportunity Cost (\$)

$$\left(\frac{\text{Estimated Lost Opportunity Cost} \left(\frac{\$}{\text{MW}} \right)}{\text{Benefits Factor of Offered Resource}} \right) * \left(\frac{\text{Capability (MW)}}{\text{Historic Performance Score}} \right)$$

Adjusted Total Cost (\$)

$$\left(\text{Adjusted Regulation Capability Cost} \left(\frac{\$}{\text{MW}} \right) \right) + \left(\text{Adjusted Lost Opportunity Cost} \left(\frac{\$}{\text{MW}} \right) \right) + \left(\text{Adjusted Performance Cost} \left(\frac{\$}{\text{MW}} \right) \right)$$

Capability Component Performance Component

Historical Performance Score

- Average of last 100 hours of resource's performance scores

Historical Mileage

- 30 days average of PJM regulation control signal-type mileage

Benefits Factor

- RegD resources are scaled factor, Reg A resources use 1.0

Adjusted Regulation Performance Cost (\$)

$$\left(\frac{\text{Performance Offer} \left(\frac{\$}{\Delta \text{MW}} \right)}{\text{Benefits Factor of Offered Resource}} \right) * \left(\frac{\text{Historic Mileage of Offered Resource Signal Type} \left(\frac{\Delta \text{MW}}{\text{MW}} \right)}{\text{Historic Performance Score}} \right) * \left(\text{Capability (MW)} \right)$$

Regulation Effective MW

$$\text{Regulation MW} * \text{Benefits Factor} * \text{Performance Score}$$

Optimization

Optimization

- Resources cannot be committed (during the same interval) for more than one of:
 - Non-synchronized reserve
 - Synchronized reserve
 - Regulation products

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Real-Time Regulation Data/Terms

Real-Time Regulation Data/Terms

PJM >> Member

AReg – Assigned Regulation

- Static for hour as a result of market
- Sent by PJM for each resource capable of regulation

RegA – Regulation Control Signal

- Automated Generator Control signal sent by PJM to Resource owner
- Sent every 2 seconds
- Bounded by TReg

RegD – Fast Regulation

- Automated Generator Control signal sent by PJM to Resource owner
- Dynamic signal moves with the frequency deviation component of ACE
- Increases the “utilization” of the energy storage devices

Member >> PJM

TReg – Total Regulation

- Resource owner sends one number for the fleet regulation capability

CReg – Current Regulation

- Calculated value where fleet is operating relative to regulation band
- Fleet-wide value sent from Resource owner to PJM
- Sent every 4 seconds

Unit Reg – Resource allocation

- Allocation should be sent as percent allocation for each individual regulating resource of the resource AReg

Load BP – Operational Midpoint

- The point around which the regulating resource (unit, plant or registration) operates

Managing Regulation Data

Managing Regulation Data

The following Markets Gateway pages are used to manage the Regulation Offers:

- **Unit Detail** - use this web page to enter regulating high and low limits
- **Regulation Offer** - use this web page to create regulation offers and modify the status of the regulation offer
- **Regulation Updates** - use this web page to update regulation resource availability and parameters on an hourly basis. (up to **65 minutes** prior to the beginning of the desired operating hour)
- **Regulation Bilateral Transactions** - use this web page to facilitate a regulation bilateral transaction

Regulation Parameters in Unit Detail

Regulation Parameters in Unit Detail

- **Regulation Max MW:** Maximum generation limit when unit is providing regulation
- **Regulation Min MW:** Minimum generation limit when unit is providing regulation
- **Reduced Ramp Rate (%) =** Minimum Reduced Ramp Rate Floor Percent - Minimum percentage of the bid-in ramp rate used for the reduced energy ramp rate logic when a unit is providing both energy and regulation
 - If zero (the default value), then 100% of the assigned Regulation MW (divided by 5) will reduce the bid-in energy ramp rate for SCED
 - Note: Hourly updates are made on the Regulation Update Screen, not the Unit Hourly Screen

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Generator > Unit > Detail

Generator > Unit > Detail

Hourly Updates **Detail** Ramp Rates Ramp Rates Updates Wind Forecast Solar Forecast IntraDay Opt Out Storage Updates

BDLLC > 2025-06-25 > BDLLC AMMERBAC 10 Steam (20335110) Last Updated Date/Time: 2023-11-07 00:00:00

Description	
Type of Unit	Single Boiler
Unit Number	10
Node	AMMERBAC20 KV Steam1
Plant Name	AMMERBAC
Unit Name	10 Steam
Operating Company	BDLLC
Defaults	
Miscellaneous	
CIR:	<input type="text"/>
Self Supply	<input type="checkbox"/>
Economic & Emergency	
Regulation	
Minimum MW	330
Maximum MW	850
Cost	
Use Cost Based Startup 1	<input checked="" type="checkbox"/>
Use Cost Based Startup 2	<input checked="" type="checkbox"/>
Condense	
Available	<input type="checkbox"/>
Energy Hkcon	<input type="text"/>
Startup Cost	<input type="text"/>
Tn Generation Cost	<input type="text"/>

Summary Description of October 1, 2025 Changes

Summary Description of October 1, 2025 Changes

Two signals and two products (RegUp and RegDn) to one signal and product

Regulation Requirement

1. Redefinition of days classified under various seasons
2. "High" (formerly "Ramp") will be 750 MW and "Low" (formerly "Non-Ramp") will be 550 MW
 - a. Transition hour going from High to Low will be 650 MW
3. Redefinition of hours considered "high" regulation and "low" regulation

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Summary Description of October 1, 2025 Changes (Contd.)

Opportunity Cost Calculation

1. Use schedule resource running for energy, else cheaper of available schedule for offline
2. Use tracking desired MW at LMP ramp rate limited
3. Use area between LMP and energy schedule resource is running on
Shoulder interval opportunity cost for two five-minute ramp-in intervals and two five-minute ramp-out intervals (currently, three intervals ramp-in and three intervals ramp-out)

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Summary Description of October 1, 2025 Changes (Contd.)

Performance Score change from Accuracy, Delay and Precision to Precision only

Eliminate “cost increase in VOM” except for Regulation-only resources

Change from hour clearing and commitment to 30-minute clearing and commitment

Self-Deassign regulation will cause a zero performance score for period de-assigned

Knowledge Check

1. What is the current Non-Ramp Regulation Requirement?

- a. 500 MW*
- b. 525 MW*
- c. 800 MW*
- d. 825 MW*

2. When must regulation offers be submitted?

- a. 1100 the day before the Operating Day*
- b. 1415 the day before the Operating Day*
- c. 1100 of the Operating Day*
- d. 1415 of the Operating Day*

3. Beginning October 1, 2025, a resource's regulation performance score will be based on:

- a. Delay*
- b. Precision*
- c. Accuracy*
- d. Mileage*

Summary

Summary

In this presentation, we:

- Defined performance based regulation
- Identified regulation resource eligibility criteria
- Explained the different types of regulation
- Identified the role regulation has in PJM Markets
- Identified Regulation Market changes occurring October 1, 2025

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Questions

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