Regulation Redesign Phase 1 Production Update

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Market Implementation Committee
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Phase 1 Summary of Changes

#	Design Components	Summary Description
1	**Signals and Products**	Change from ***two*** signals (RegA and RegD) bidirectional to ***one*** signal bidirectional that all resources that are assigned Regulation in a given market interval will follow.
2	**Requirement MW**	Changes to better reflect operational needs with consideration both to historic and future system conditions
3	**Performance Scoring**	Change from accuracy, delay and precision to precision only.
4	**Offer and Clearing Timing**	Eliminate “cost increase in VOM” except for Reg-only resources; change from hour clearing and commitment to 30-minute clearing and commitment.
5	**Opportunity Cost Calculation Reform**	1. Use the schedule the resource is running for energy or else the cheaper of available schedule for offline. 2. Use tracking desired megawatt at LMP ramp-rate limited. 3. Use the area between LMP and the energy schedule the resource is running on.
6	**Settlement**	For the eligible resources, settlement will calculate the shoulder interval opportunity cost for two five-minute ramp-in intervals before the resource Regulation operation and two five-minute ramp-out intervals following the resource Regulation operation (currently, three intervals ramp-in and three intervals ramp-out). Also, settlement will update the calculation for the regulation mileage credit (currently performance credit) such that the mileage ratio is equal to real-time regulation mileage/historic regulation mileage.

High-Level Summary of the Regulation Phase 1 in Production

The implementation of Phase 1 is functioning as designed and aligns with the Regulation Redesign business rules.

Regulation prices to-date have been verified and finalized.

Issues with two value-added features have been resolved.

- *Resources clearing in alternating 30-minute intervals*
- *Resources pre-ramping into the Regulation interval*

Regulation Redesign Phase 1 has been successfully promoted to production as scheduled on **Oct. 1, 2025**

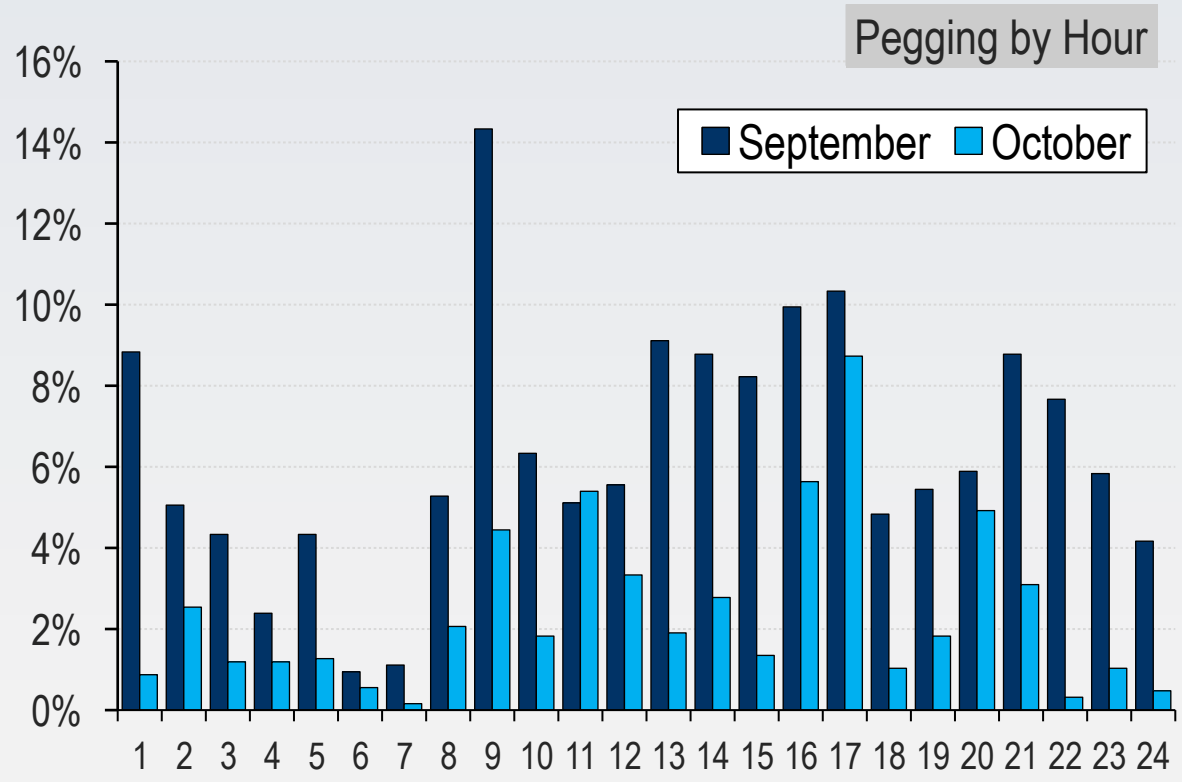
Thank you for your active engagement and participation during testing, as well as your thoughtful feedback.

Regulation Operations

Regulation Requirement Effective Megawatts

Season	Dates	Hours Ending	Requirement MW
Winter	Nov. 1–Feb. 28	HE 5–10, HE 17–24	750
		HE 1, HE 11	650
		HE 2–4, HE 12–16	550
Spring	March 1–April 30	HE 19–1, HE 6–9	750
		HE 2, HE 10	650
		HE 3–5, HE 11–18	550
Summer	May 1–Sept. 15	HE 5–1	750
		HE 2	650
		HE 3–4	550
Fall	Sept. 16–Oct. 31	HE 6–9, HE 18–24	750
		HE 1, HE 10	650
		HE 2–5, HE 11–17	550

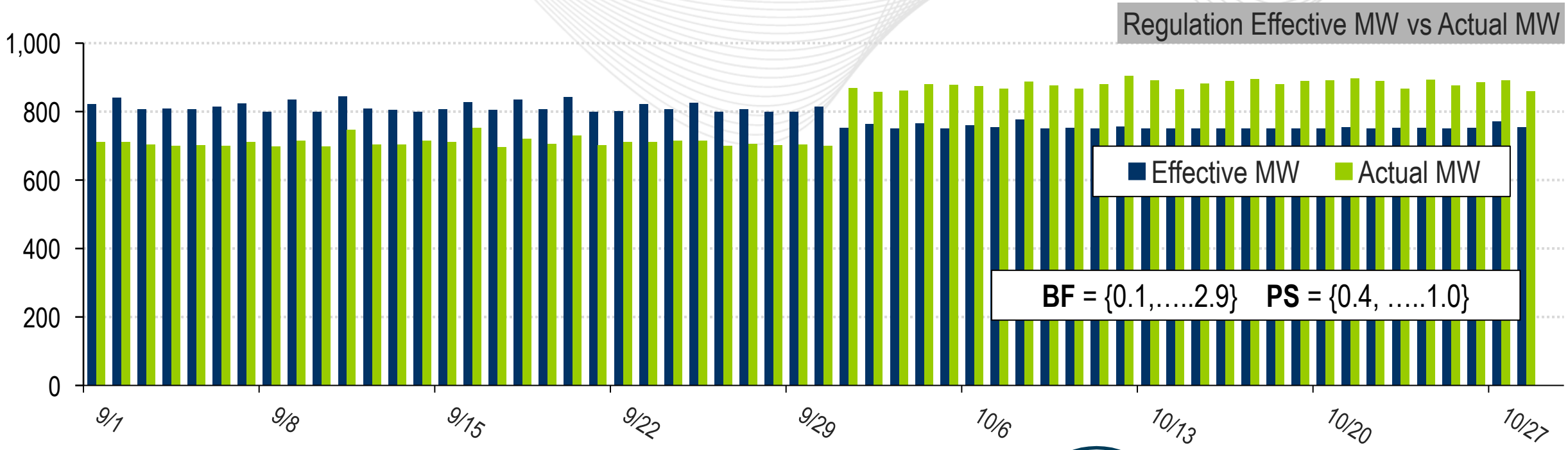
Average of Regulation Utilization Greater than 99%



Key Takeaway:

With the limited data, the revised requirement megawatts seem to improve Regulation utilization.

Effective Megawatts vs. Actual Megawatts



Key Takeaway:

More actual megawatts lead to a better control of ACE.

Oct. 1, 2025

PRE OCT 1:

Effective MW =
Actual MW **x** Performance Score (PS) **x** Benefit Factor (BF)

FROM OCT 1:

Effective MW =
Actual MW **x** Performance Score

Performance Score Review

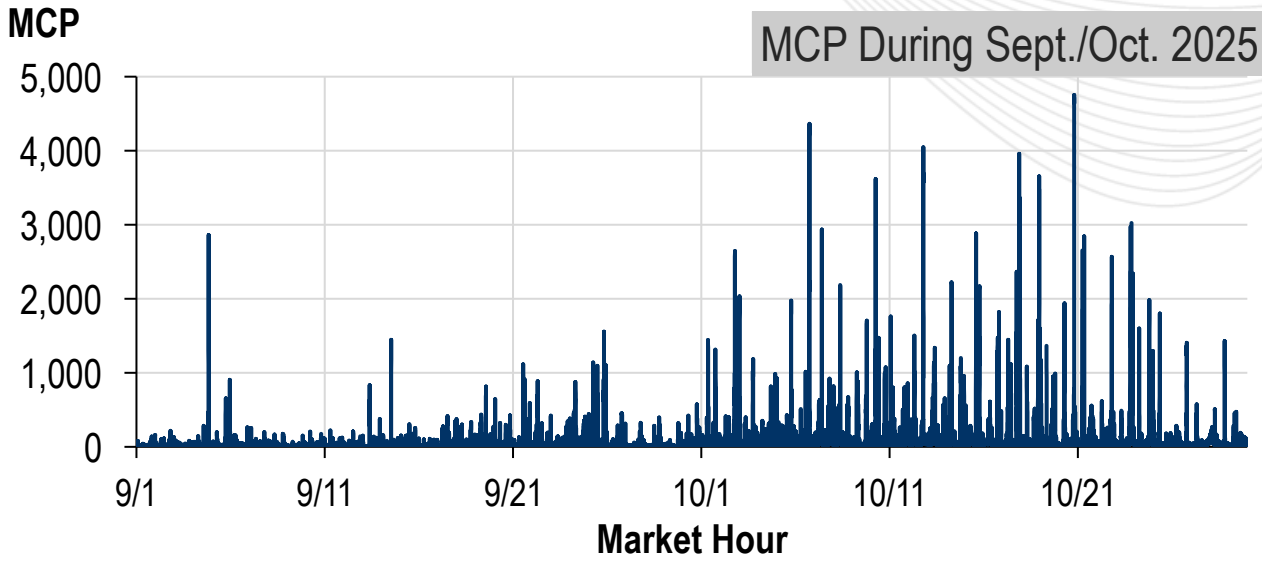
	Signal	CT	DSR	Storage	Hydro	Steam
RegA 09/2025	**Hist Perf Score**	**88%**	**83%**		**91%**	**82%**
	Total MW	*2,370 MW*	*28 MW*		*967 MW*	*5,415 MW*
RegD 09/2025	**Hist Perf Score**	**80%**	**89%**	**93%**	**78%**	
	Total MW	*132 MW*	*53 MW*	*247 MW*	*334 MW*	
Reg 10/2025	**Hist Perf Score**	**87%**	**91%**	***94%***	***90%***	**79%**
	Total MW	*2,457 MW*	*51 MW*	*232 MW*	*967 MW*	*5,536 MW*

Key Takeaway:

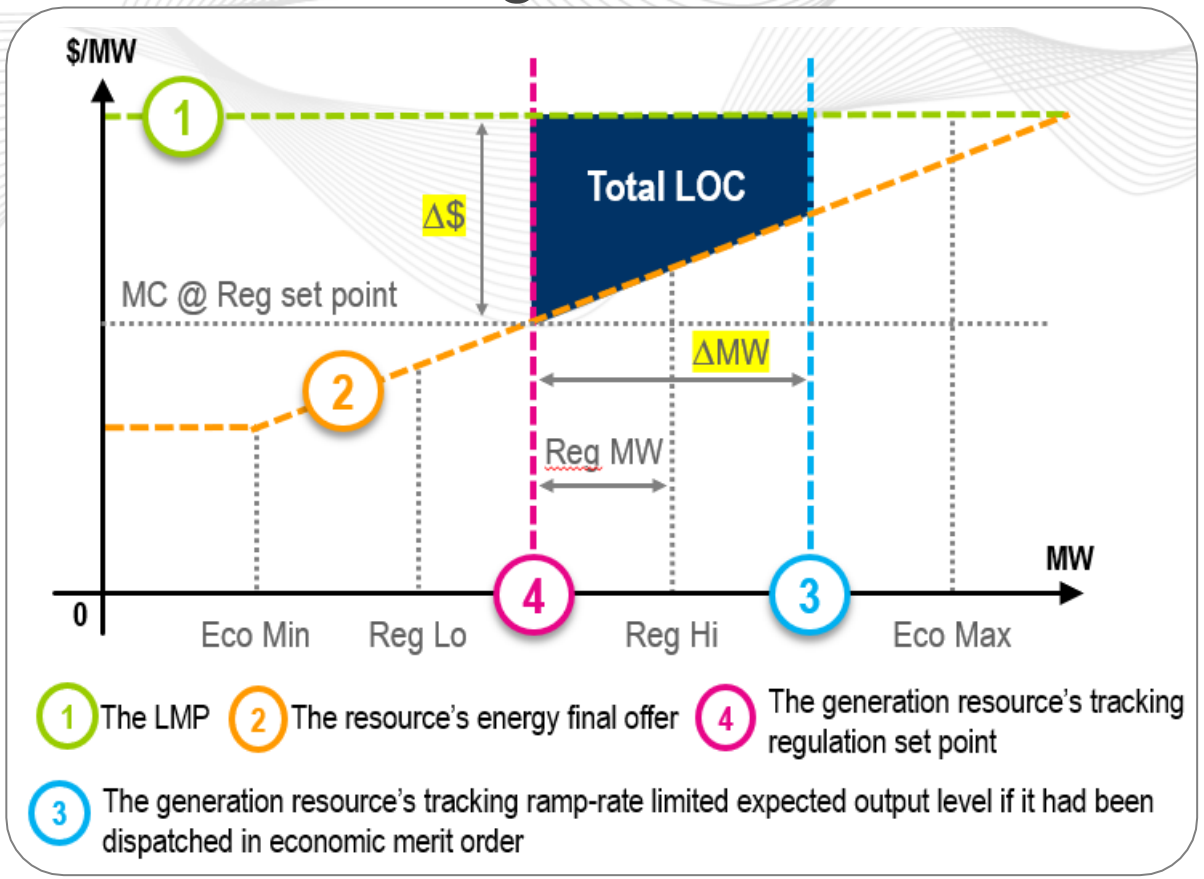
No Deterioration of Performance Score Despite a More Stringent Scoring

Note: *Data confidentiality practice is the reason for the empty cells.*

Regulation Market Clearing Price Calculation



#	Local Interval	MCP ($/MWh)	#	Local Interval	MCP ($/MWh)
1	10/3/2025 17:50	33,897.14	6	10/19/2025 7:55	7,811.19
2	10/3/2025 17:45	29,636.32	7	10/23/2025 19:00	6,130.41
3	10/13/2025 8:00	16,238.23	8	10/21/2025 5:45	5,882.91
4	10/23/2025 20:20	12,966.25	9	10/23/2025 18:55	5,780.99
5	10/23/2025 20:25	9,307.84	10	10/13/2025 8:05	5,536.53
6	10/19/2025 7:55	7,811.19	11	10/20/2025 19:25	5,074.98



Key Takeaway:

Regulation prices to-date have been verified and finalized.

Reg MCP = max[Adjusted Offer Prices + Adjusted RegLOC]

Use of Regulation 'Min Offer MW' Parameter To Avoid Fractional Megawatt Clearing

Large megawatt resources may clear
Regulation for fractional megawatt quantities.
This can pose operational challenges or reduce performance efficiency.

Regulation Market Sellers to utilize the "Min Offer MW" parameter on the *Markets Gateway* > *Regulation Market* > *Offers page* to define the smallest Regulation megawatt quantity a resource can reliably provide.
M11 Section 3.7.2.1

Email Contacts

Inquiry	Email Contact
To request a Regulation test	RegulationTesting@pjm.com
Regulation telemetry – signal setup or conversion	PJMTelemetrySupport@pjm.com
Regulation redesign questions	RegulationDesign@pjm.com
Communication to PJM Member Relations	custsvc@pjm.com

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Market Implementation Committee

– Regulation Redesign Production Update

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Regulation Market Clearing Price Calculation

- Reg MCP = max[Adjusted Offer Prices + Adjusted RegLOC]
  - Adjusted Offer Prices includes the Capability and Mileage Offer prices
  - Adjusted RegLOC = $\frac{\Delta\$ * \Delta MW}{PS * RegMW}$
- Adjusted RegLOC constitutes the majority of the Reg MCP
- Adjusted RegLOC can increase with
  - Wider Δ$
  - Wider ΔMW
  - Lower Performance Score of the marginal resource (0.4 to 0.99)
  - Fractional RegMW (0.1 to 0.9)