Regulation Redesign Phase 2 Implementation Timeline & Outlook

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Operating Committee
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Regulation Redesign Phase 2 Implementation

Action Required	Deadline	Who May Be Affected
Communicate to staff about the Regulation Redesign Phase 2 implementation	**10/1/2026**	Regulation Market Participants

Regulation Redesign – Phase Implementation and Timeline

FERC Approval on June 14, 2024

Clean order accepting our Regulation Market Reform 205 filing

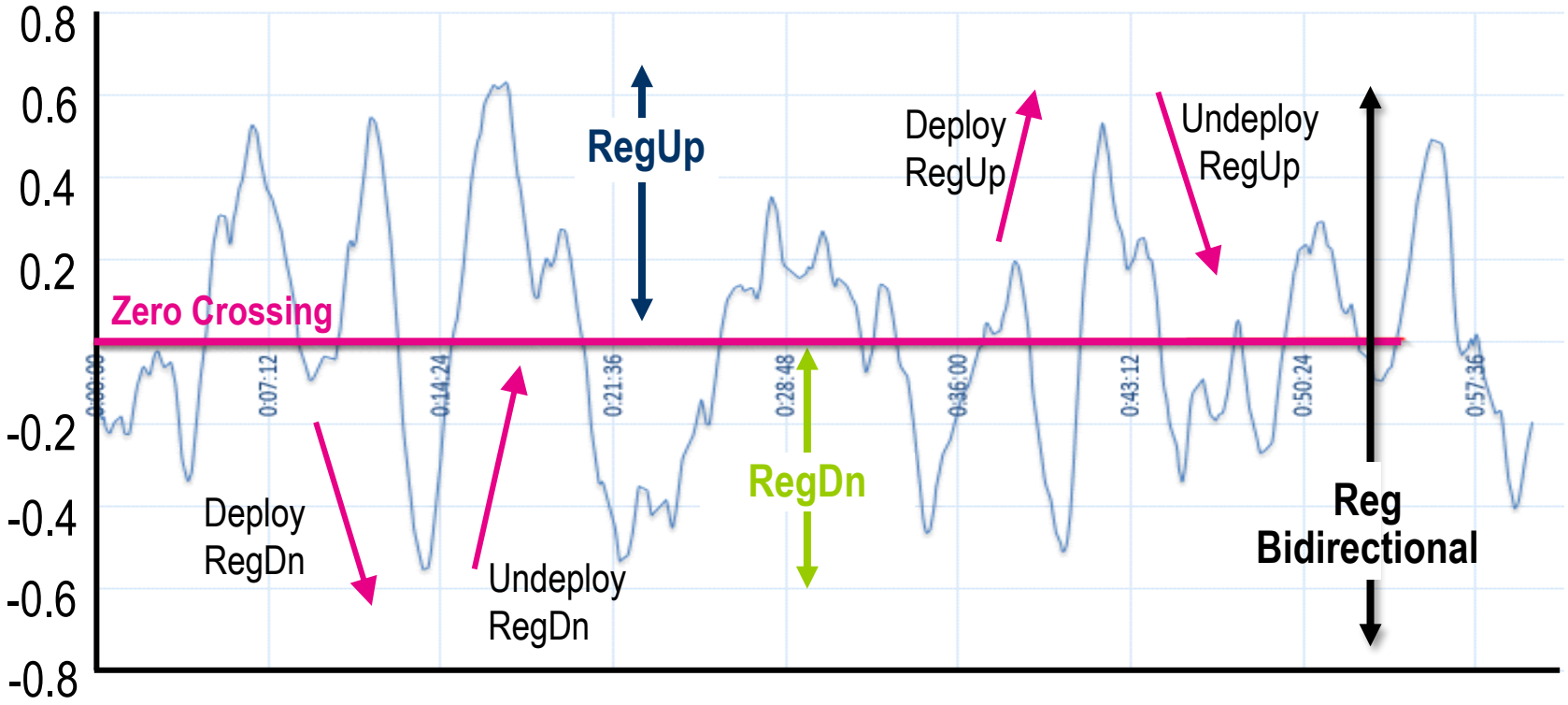
Phase 1 Went Live

Oct. 1, 2025

Phase 2 Go-Live

Oct. 1, 2026

Moving From a One-Signal Bidirectional Product to One-Signal RegUp and RegDn Products



- RegUp product operates above the zero crossing.
- RegDn product operates below the zero crossing.
- Resources will be able to follow the full signal (bidirectional) by being assigned RegUp and RegDn.
  - Only one product will be deployed at a time.

Regulation Signal and Market Products – Phase 2

Moving From a One-Signal Bidirectional Product to One-Signal RegUp and RegDn Products **will split many of the design elements into two.**

Two Requirements:
One for RegUp and one for RegDn

Two Offers:
One for RegUp and one for RegDn

Two performance scores and mileages:
One for RegUp and one for RegDn

Two clearing prices:
One for RegUp and one for RegDn

Two settlement billings:
One for RegUp and one for RegDn

Phase 2 Regulation Signal/Products

AGC Signal

The output equals RegUp plus RegDn signal and sent to members as RegA.

=

RegUp

RegUp equals the regulation control signal multiplied by the TRegUp.

+

RegDn

RegDn equals the regulation control signal multiplied by the TRegDn.

Types of Awards	ARegUp	AReg Dn	RegUp	RegDn	Reg
RegUp only	10	0	RC*10	RC*0	0 to 10
RegDn only	0	10	RC*0	RC*10	0 to -10
RegUp and RegDn	10	10	RC*10	RC*10	10 to -10

RC = Regulation controller signal

PJM.com > Markets & Operations > Ancillary Services > Regulation Redesign Phase 2 FAQs (PDF)

RegUp/RegDn Prices Outlook – Disclaimer

The information in this presentation and other subsequent presentations or reports regarding the RegUp and RegDn pricing outlook is for **illustrative and educational purposes only.**

- Forward-looking statements about price behavior are based on expected market design mechanics and conceptual operating scenarios
- Actual market outcomes will depend on:
  - Real-time system conditions
  - Resource availability, offers, parameters, and market sellers' bidding behavior
  - Load patterns and generation mix
  - Transmission constraints and operating events

Nothing in this presentation and other subsequent presentations or reports should be interpreted as a:	Guarantee of future regulation market prices	Forecast of participant revenues or costs

RegUp Pricing Outlook

RegUp prices are likely to:

- Be more closely tied to real-time energy market conditions
- Reflect opportunity costs of generators that could otherwise sell energy
- Increase during periods of
  - High load, tight generation supply, energy price spike (LMP volatility)

Key Takeaway:	RegUp prices may rise during system stress or upward scarcity.

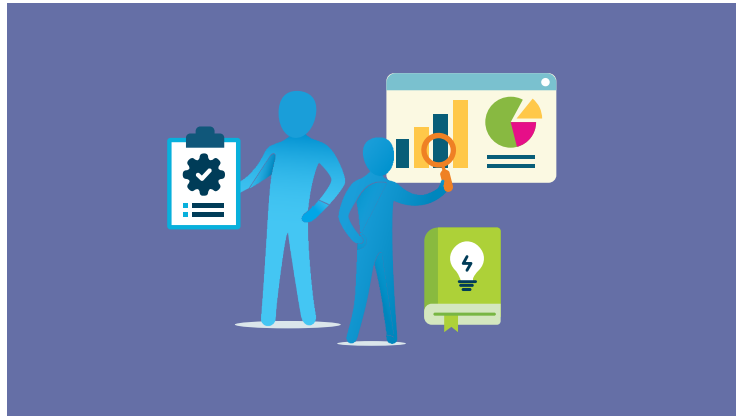
RegDn Pricing Outlook

RegDn prices
are likely to:

- Be higher when the system has excess generation
- Reflect the value of resources that can reduce output
- Increase during periods of
  - Low load, renewable oversupply conditions, situations requiring downward balancing flexibility

Key Takeaway:	RegDn prices respond to surplus and the need to move generation downward.

Expected Collaboration



Regulation market seller engagement

- Reliance on RegUp/RegDn offer data
- Proactively participates in the project activities
- Timely report of issues/concerns

Rigorous testing and simulations

- Sandbox opens for offer data and market results
- Leveraging Market PCT in simulations for insightful market outcomes

Phase 2 Milestones and Tentative Timeline

No.	Milestone	Timeline
1	**Regulation Redesign project – information update at the TCF**	March 2026
2	**Open Houses 1 & 2 (virtual)**	March and July 2026
3	**Markets Gateway Train (Sandbox) opens for testing**	April 2026
4	**RegUp/RegDn resources conversion testing begins**	April 2026
5	**All related manuals first read (Phase 1): M11, M12, M15, M28**	July 2026
6	**All related manuals endorsed (Phase 1): M11, M12, M15, M28**	August 2026 (September if needed)
7	**Special education session**	August/September 2026
8	**Regulation Redesign Phase 2 market opens**	Sept. 25, 2026
9	**Regulation Redesign Phase 2 go-live (cutover)**	Oct. 1, 2026, at 00:00

Posted Documents for Phase 2 Changes

The following documents have been posted on the Ancillary Services page under a new section called **Regulation Redesign Phase 2**:

PJM.com > Markets & Operations > Ancillary Services >

1. **Regulation Up & Down Effective Megawatt Requirement Definition (PDF)**
2. **Regulation Redesign Phase 2 FAQ (PDF)**

Email Contacts

Inquiry	Email Contact
To request a Regulation test	RegulationTesting@pjm.com
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Regulation redesign questions	RegulationDesign@pjm.com
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Regulation Redesign Phase 2 – Implementation Timeline and Outlook

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Acronyms

Acronym	Term & Definition
LMP	**Locational Marginal Price –** The marginal price for energy at the location where the energy is delivered or received. LMP is a pricing approach that addresses transmission system congestion and loss costs as well as energy costs.
MCP	**Market Clearing Price –** The price that is paid by all load and paid to all suppliers for the service received or provided
LOC	**Lost Opportunity Cost –** In general, the foregone revenues resulting from following PJM's dispatch instructions to provide some type of ancillary service. Lost opportunity costs are calculated for generating units participating in many PJM markets.
MW	**Megawatt –** A unit of power equaling one million watts (1 MW = 1,000,000 watts) or one thousand kilowatts (1 MW = 1,000 kW). To put it in perspective, under non-severe weather conditions, one MW could power roughly 800 to 1,000 average-sized American homes.
PCT	**Production-Controlled Testing** - a pre-production environment that simulates the production environment by mirroring production data and configurations.

PJM Glossary

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Appendix

Phase 2 Summary of Changes

#	Design Components	Summary Description
1	**Signals and Products**	Bifurcate ***one*** signal bidirectional to two products, **RegUp and RegDn**, each with its own requirement, clearing price and settlement. Eligible resources will be able to offer, clear and follow either the RegUp, RegDn or both in a given market interval. Only one product is deployed at a time.
2	**Requirement MW**	Seasonal and hourly requirement MW separate for RegUp and RegDn may be asymmetric to better reflect operational needs, with consideration both to historic and future system conditions and with annual requirements MW updates.
3	**Performance Metrics**	Phase 1 changes plus performance score, mileage and bias-factor calculation separately for RegUp and RegDn.
4	**Offer and Clearing Timing**	Phase 1 changes plus offer MW, offer price and availability status separately for RegUp and RegDn. Offer MW will change from hourly granularity to 30 min. granularity.
5	**Opportunity Cost Calculation**	Separate resource's RegUp and RegDn opportunity cost for pricing. Settlements will calculate one intra-commitment opportunity cost that accounts for both RegUp and RegDn assignments on a resource. The settlements calculated intra-commitment opportunity cost will also account for the amount of energy produced while providing Regulation, referred to as "Regulation signal bias."
6	**Settlement**	Regulation billing for Reg Up and Reg Dn – Separate clearing price credits for RegUp and RegDn – Ability to submit Regulation bilateral transactions separately for RegUp and RegDn – Separate clearing price charges for RegUp and RegDn – A single lost opportunity lost credit accounting for both RegUp and RegDn assignments – A single lost opportunity cost charge