Manual 28 – Regulation Market Redesign, Phase 2

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Action Required	Deadline	Who May Be Affected
Communicate Manual 28 updates to impacted staff	**12/1/2026**	PJM Members and Market Participants

Regulation Clearing Price Credit
Section 4.2.1

Clearing Price credits updated to account for RegUp and RegDn product types

- Calculated for each five-minute interval
- If actual five-minute performance score by product type < 0.25, credit = $0.

Regulation Market Capability Clearing Price credit **by product type**
$\text{RegUp MW} \times \text{RegUp Actual Performance Score} \times \frac{\text{RegUp RMCCP}}{12}$
$\text{RegDn MW} \times \text{RegDn Actual Perf Score} \times \frac{\text{RegDn RMCCP}}{12}$

Regulation Market Mileage Clearing Price credit **by product type**
$\text{RegUp MW} \times \text{Reg Up Actual Perf Score} \times \frac{\text{RegUp Actual Mileage}}{\text{Reg Up Daily Historic Mileage}} \times \frac{\text{RegUp RMMCP}}{12}$
$\text{RegDn MW} \times \text{RegDn Actual Perf Score} \times \frac{\text{RegDn Actual Mileage}}{\text{RegDn Daily Historic Mileage}} \times \frac{\text{RegDn RMMCP}}{12}$

Regulation Lost Opportunity Cost Credit
Section 4.2.2

Regulation LOC Credit updated to account for both product types

If a pool-scheduled resource is not compensated for its offer plus any opportunity costs via the clearing prices, a resource receives an uplift credit referred to as the Lost Opportunity Cost Credit.

Lost Opportunity Cost credit =

$$\frac{\text{(Regulation Offers + Intra-commitment opportunity cost * Actual Performance Score + Shoulder opportunity cost)}}{12} \text{ - Regulation Clearing Price credits}$$

If applicable 5-minute performance score < 0.25, LOC credit = $0

- If a resource is providing both RegUp and RegDn products in the interval,
  - Regulation Offers = RegUp Offer + RegDn Offer
  - Regulation Clearing Price credits = RegUp Clearing Price credits + RegDn Clearing Price credits
  - A single intra-commitment opportunity cost is calculated and the weighted average of the RegUp and RegDn performance scores is used.
- Intra-commitment opportunity costs and shoulder interval opportunity costs for Economic Load Response Participant resources and regulation only resources are zero.

Intra-commitment Opportunity Cost
Section 4.2.2.1

- Updated with calculations and illustrative examples for the following:
  - Non-hydro Resources: Bias adjusted tracking regulation set point and intra-commitment opportunity cost
  - Hydro Resources: Bias adjusted deviation MW and intra-commitment opportunity cost
  - Performance Adjusted Intra-commitment Opportunity Cost
    - Intra Commitment Opportunity Cost is multiplied by the applicable actual performance score. If resource is providing both RegUp and RegDn products in the interval, a single intra-commitment opportunity cost is calculated and the weighted average of the RegUp and RegDn performance scores is used.
  - Shoulder opportunity cost: Replaced set point calculation with use of the tracking set point consistent with markets.

Regulation Obligation
Section 4.3.1 - NEW

- New section detailing hourly obligation and adjusted obligation calculations by product type

RegUp Obligation =	Total Effective RegUp x	$\frac{\text{RT Load}}{\text{Total PJM RT Load}}$
RegDn Obligation =	Total Effective RegDn x	$\frac{\text{RT Load}}{\text{Total PJM RT Load}}$

Total Effective Regulation by product type is the hourly integrated sum of the 5-minute interval Regulation MW multiplied by the actual performance score for all pool-scheduled and self-scheduled resources.

RegUp Adjusted Obligation =	RegUp Obligation + RegUp Bilateral Sale – RegUp Bilateral Purchase
RegDn Adjusted Obligation =	RegDn Obligation + RegDn Bilateral Sale – RegDn Bilateral Purchase

Regulation Clearing Price Charge
Section 4.3.2

- Updated to reflect hourly Clearing Price charges by product type

RegUp Capability Clearing Price charge =	Total RegUp RMCCP credits x	RegUp Obligation / Total PJM RegUp Obligation
RegUp Mileage Clearing Price charge =	Total RegUp RMMCP credits x	RegUp Obligation / Total PJM RegUp Obligation

RegDn Capability Clearing Price charge =	Total RegDn RMCCP credits x	RegDn Obligation / Total PJM RegDn Obligation
RegDn Mileage Clearing Price charge =	Total RegDn RMMCP credits x	RegDn Obligation / Total PJM RegDn Obligation

Regulation Lost Opportunity Cost Charge
Section 4.3.3

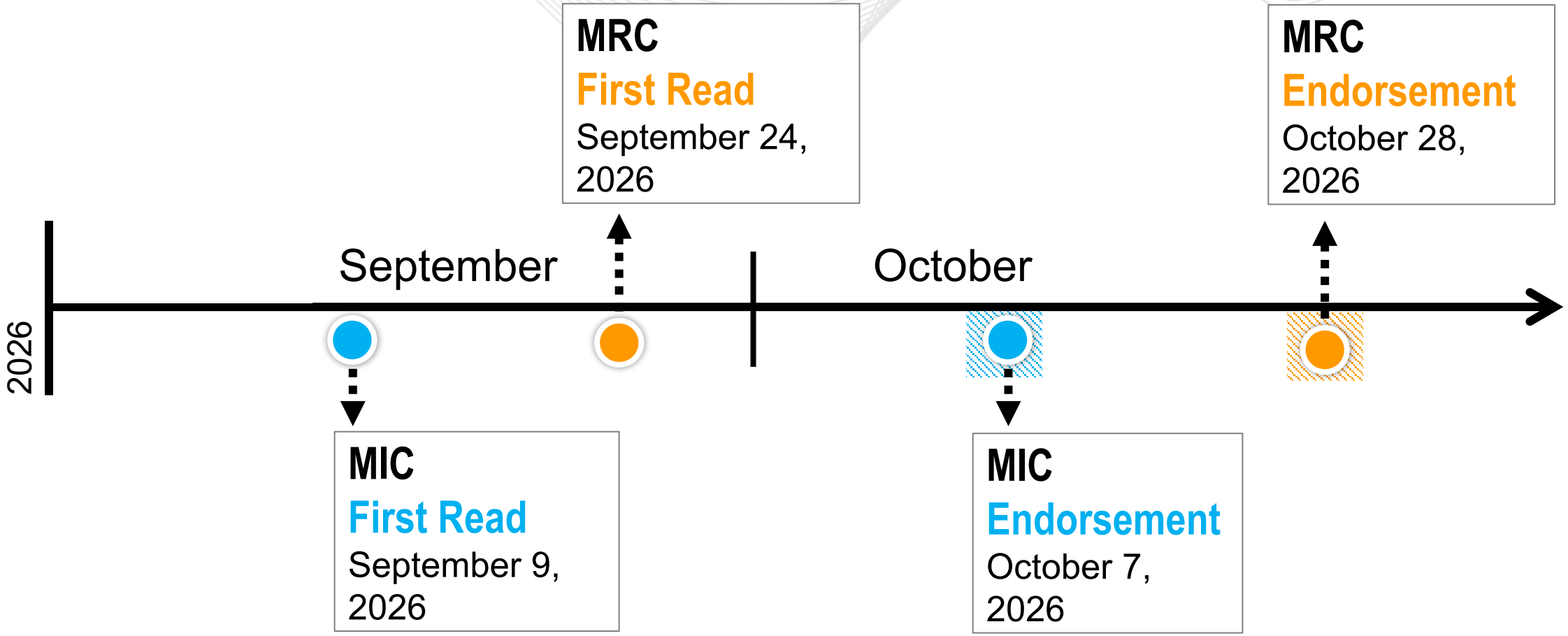
- Updated to include purchases by product type

RegUp Purchases =	Max (RegUp Obligation – RegUp Self Scheduled Regulation MW, 0)
RegDn Purchases =	Max (RegDn Obligation – RegDn Self Scheduled Regulation MW, 0)
Reg Lost Opportunity Cost charge =	Total Lost Opportunity Cost credits x $\frac{\text{RegUp Purchases + RegDn Purchases}}{\text{Total PJM RegUp and RegDn Purchases}}$

Manual 28
Other Changes

- Section 5.2.6.4 and 5.2.8 – Removed reference to marginal benefit factor that was missed during Regulation Phase 1 manual updates.

Review/Endorsement Timeline



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